Devoted to
TEXTILE
CHEMISTRY
BLEACHING
DYEING
PRINTING
FINISHING

APRIL 7, 1947
VOLUME 36, No. 7

AMERICAN DYESTUFF REPORTER

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APR 14

An essential segment . . .

of the *Solophenyl* Series is the grey element. For this essential there is available

Solophenyl Grey 4 G L

providing not only a shading element for that amazing series but also a self-shade of desirable neutral quality.

It is needless to say that it is faster-to-light—the name gives it away. But with good washing fastness thrown in the scope of Solophenyl Grey 4 G L is so much wider in the Rayon Cotton fields.

More intimate detail is contained in Circular 1026.

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of the
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AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

For Superior

ANILINE BLACKS

1. GOOD PRINTING PROPERTIES
2. MINIMUM TENDERING OF THE FABRIC
3. DENSE, PLEASING TONE OF SHADE
4. EASE OF PREPARATION
5. FREEDOM FROM GRIT

Order...CYANAMID'S AERO* BRAND

YELLOW PRUSSIATE OF SODA
[Sodium Ferrocyanide $Na_4Fe(CN)_6 \cdot 10H_2O$]

YELLOW PRUSSIATE OF POTASH
[Potassium Ferrocyanide $K_4Fe(CN)_6 \cdot 3H_2O$]

PRUSSIATE ANILINE BLACKS are adaptable for printing cotton and rayon in a wide variety of styles in combination with vat dyes, rapid fasts and steam colors. This process is most effective in reducing tendering of the fabric, and minimizes the electrolytic effect on the doctor blade.

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1. Uniformly high quality over 99% Yellow Prussiate of Soda or Yellow Prussiate of Potash.
2. Close chemical control from basic raw materials to the finished product.
3. Small crystalline form dissolves readily in hot or cold water.

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AMONG CYANAMID PRODUCTS FOR THE TEXTILE INDUSTRY ARE:
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*Trade-mark **Reg. U. S. Pat. Off.

American Dyestuff Reporter, Vol. 36, No. 7, April 7, 1947. Published every other Monday. Copyright, 1947, by Howes Publishing Co., One Madison Ave., New York 10, N. Y. Domestic subscription, $5.00; Canadian, $6.00; Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

Ciba DYESTUFF GLIMPSES

In all science there is nothing more fascinating than the production of color from the sticky black substance we call coal tar. Many and various, however, are the steps that lead to the present day dyestuffs which help create our modern way of life by making clothing more cheerful, women more beautiful and life itself more enjoyable.

First comes the careful distillation of the coal tar to produce products like benzene, toluene and naphthalene. These are basic materials but Ciba has always recognized the fact that only the purest parent substances can give birth to dyestuffs of Ciba's standard. A good start is essential! As a result, these products and others developed by further processing are tested for purity again and again — as for instance, by determining the melting point.

For this purpose a little glass flask is necessary, fitted with a thermometer and a stirring appliance and heated by a small gas jet. The tiny glass tubes containing the substance under test are hung in the flask, dipping into the sulphuric acid or molten paraffin wax with which it is filled.

Let us suppose that a sample of naphthalene is being examined. If it melts at 80° C. exactly, the chemist is satisfied, for the naphthalene is pure. Should it melt at 77° C., however, it is impure and must be purified further. Every pure substance has a definite, known melting point. While naphthalene melts at 80° C., anthracene, for example, must not melt below 217° C.

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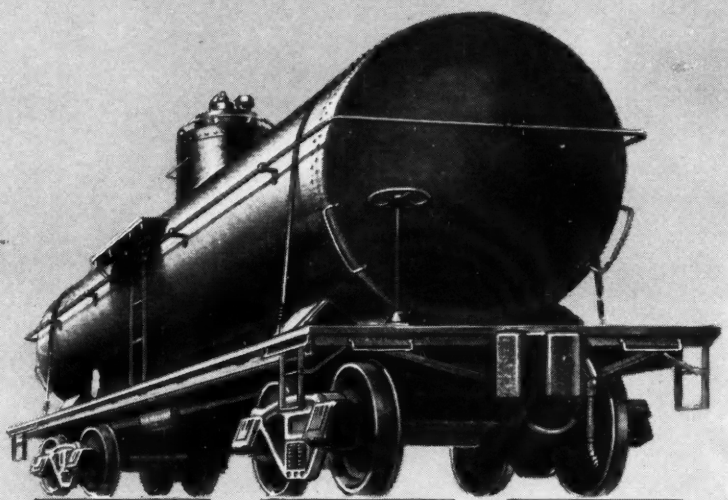
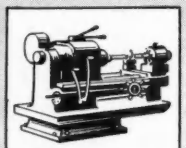
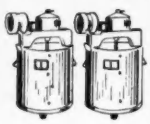


Low-titre soaps



Lubricants . . . special greases

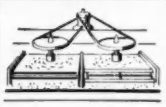


Metallic oleates . . . Esters

Textile processing

Emulsifier...Polishes, disinfectants, oil and wax emulsions

Typewriter ribbons . . . carbon papers



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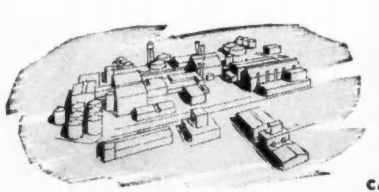
Oleic acid (Red Oil) is a versatile product fitted for important uses in many fields . . . uses for which there is no adequate substitute. In every case it is important to define the job to be done before selecting the red oil with specifications to fit. For example, color may not always be important but color stability frequently is. Lowest titre may be essential; on the other hand, regular titres may suffice. No matter, specifications are flexible enough to provide grades for every use.

To advise on such problems is the function of the Sales Service and Development Departments of Emery. They are ready to help you.

Emery Red Oils provide:

Wider range of characteristics
Standard grades for specific uses
Uniformity in specifications

*Elaine is the trade mark for all Emery Red Oils (Oleic Acids)



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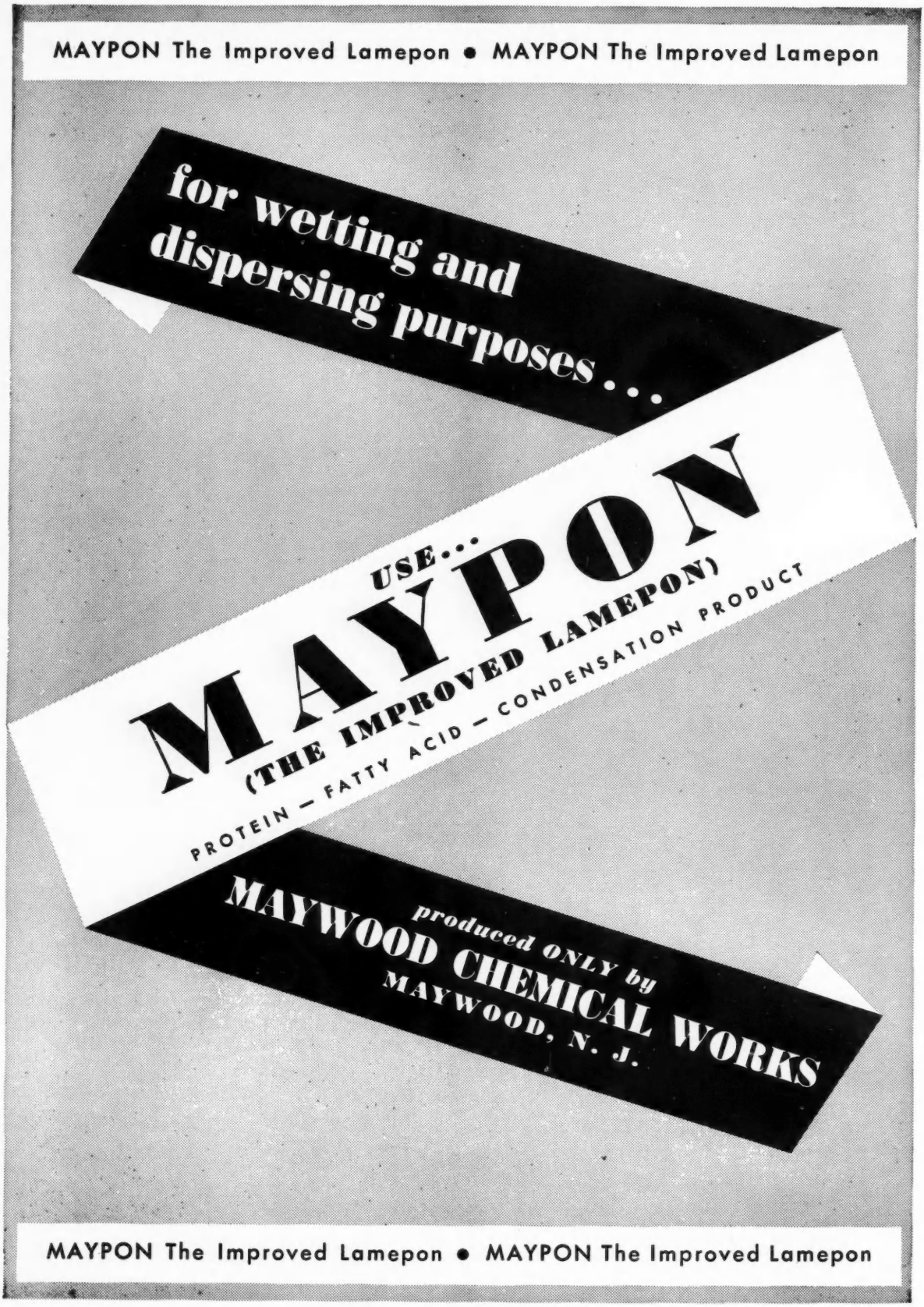
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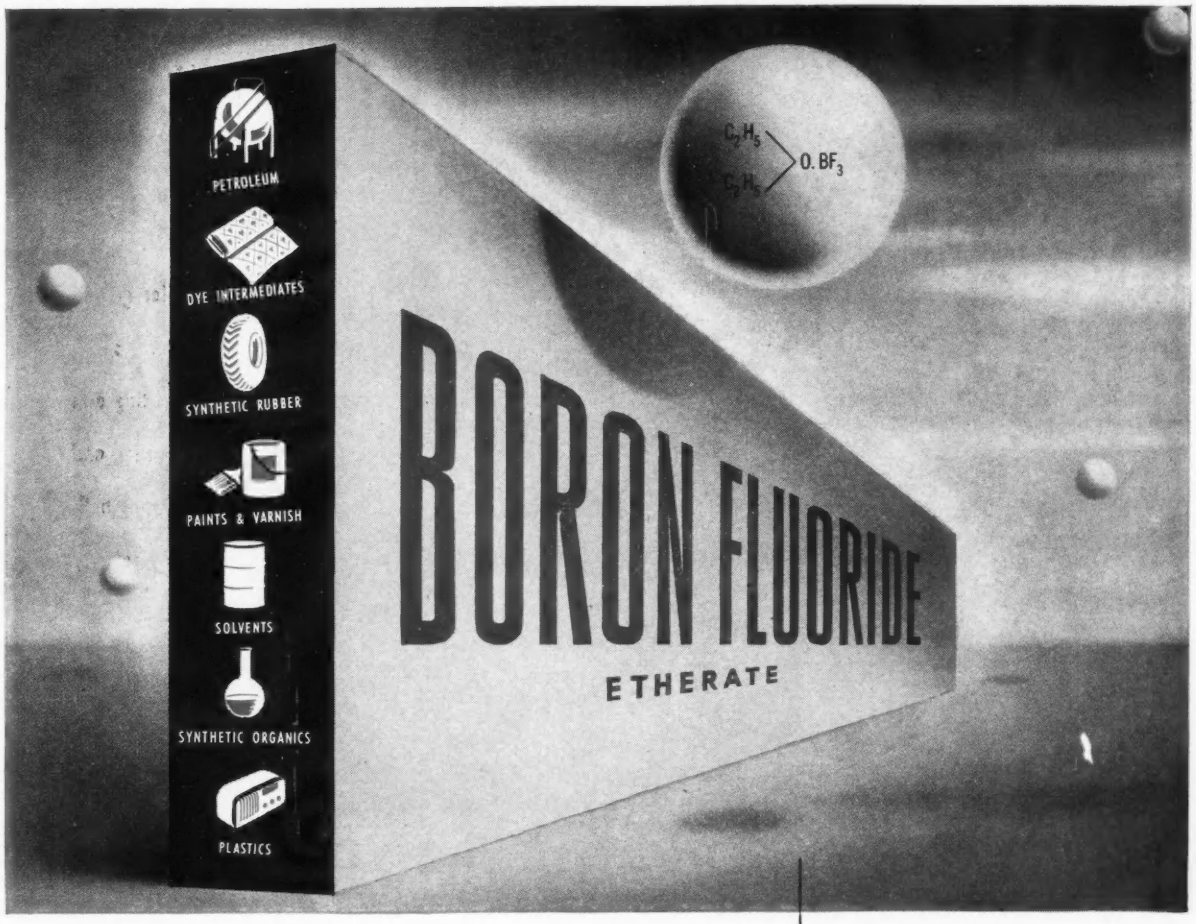

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For further information, write to General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y. An outline of your proposed application for this new catalyst will enable our technical staff to work with you toward a solution of your problem.

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BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

Physical Properties

Formula:

$$(C_2H_5)_2O.BF_3$$

Molecular Weight: 141.9
Melting Point: Less than −60°C
Boiling Point: 125°C
Specific Gravity: 1.14 at 25°C
%BF_3: 47.8% min.

Some of the Principal Reactions Catalyzed by BF_3

1. Polymerization of unsaturated compounds such as olefins, diolefins, vinyl ethers, fatty oils, and terpenes. The products may be solid polymers useful as plastics or liquids as in the bodying of drying oils for paints and varnishes.

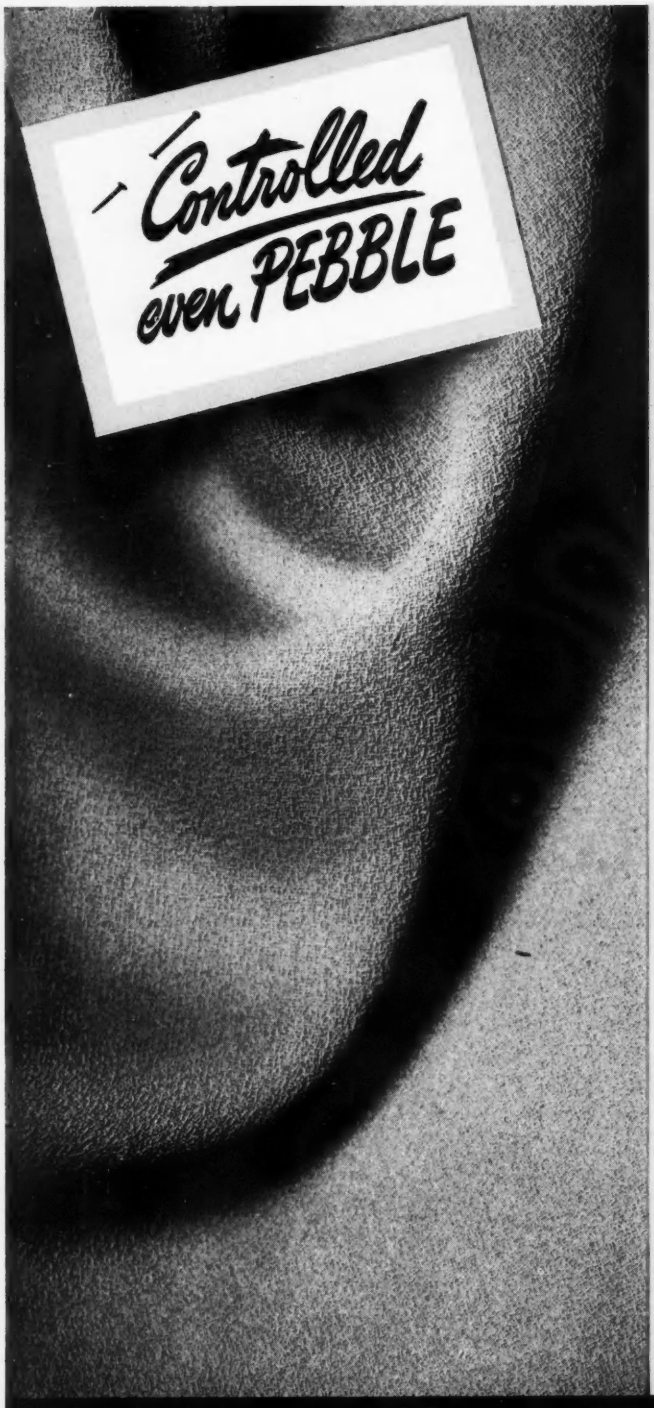
2. Condensation of aromatic nuclei with olefins and diolefins, paraffins and olefins, and aromatic nuclei or olefins with acids.

3. As a cyclizing agent for rubber.

4. As an esterification catalyst.

5. As a catalyst in the synthesis of aliphatic acids from alcohols and carbon monoxide.

6. As a promoter and dehydrating agent in the sulfonation and nitration of aromatic compounds.



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A highly concentrated soluble synthetic ester

CORASIL RT is an ideal softener for gelatin used in crepe soaking and warp sizing operations • It promotes even twisting and protects the yarn against undue tension and mechanical strains of weaving • During boil-off this product releases the twist evenly and a satisfactory

Uniform Pebble is Assured

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Get the Facts on Hooker Chemicals from our New General Products List

We've increased the size of our General Products List from 4 to 20 pages. Several new products have been added and you will want to be brought up to date on our chemicals. The increase in pages comes from an endeavor to make it easier for you to get the information you want about Hooker Chemicals.

Larger type, graphic formulas, and a new format facilitate your finding the chemicals in which you are interested. Included are description, principal physical and chemical properties, uses, and shipping containers. This new products list also describes briefly the various chemical processes and facilities which Hooker has available for industry.

You who are not yet acquainted with Hooker Chemicals will find this new Products List an excellent introduction to a source for industrial chemicals of high purity; it will also pay you to refer to this Bulletin whenever you need chemicals. Feel free, too, to call on Hooker's Technical Staff for advice and help on the application of Hooker Chemicals to your problems.

The words "Bulletin 100" on your business letterhead will bring you a copy of the Hooker General Products List.

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HOOKER ELECTROCHEMICAL COMPANY

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Paradichlorbenzene **Chlorine** **Sodium Sulfhydrate**

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There's no need for slow work at the examining and pairing tables and at subsequent operations because your 15, 20 and 30 denier nylons haven't adequate body to be handled safely and speedily.

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D-15

will give them sufficient body for easy handling besides providing a far superior finish in all other respects.

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Eternalure D-15 is a one-treatment resin finish easily used without any change either in operations or equipment. It will not build up deposits on the forms. Nor will treated hose stick to the forms.

Moreover, Eternalure D-15 has been proved by exacting dermatological tests to be completely safe for contact with the human skin. It has no primary irritating action, and no sensitizing effect.

Eternalure D-15 is well worth investigating!

Ask for a Demonstration!

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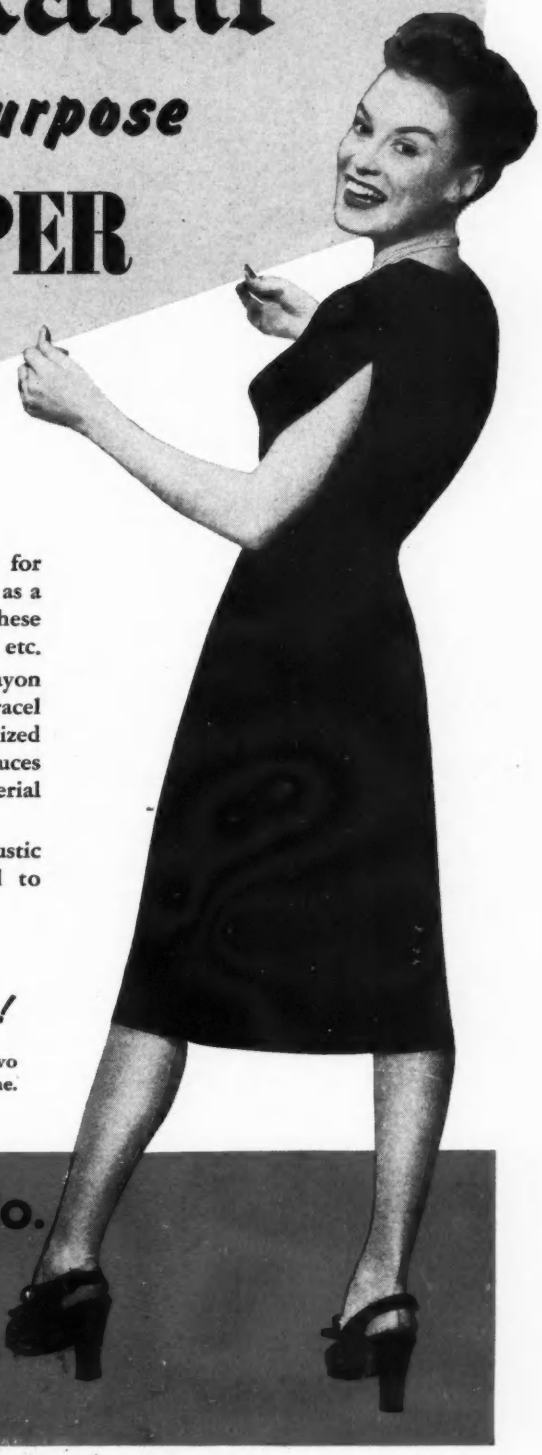
April 7

Hydroxanil

the Multi-Purpose

DEVELOPER



HYDROXANIL is not only excellent for acetate and nylon blacks but also finds extensive use as a developer for rayon and cotton developed colors. These include Diazo Black BH, Diazo Green 3G, Primuline, etc.

Wash-fast developed blacks on acetate and rayon combination materials may be obtained by using Maracel Developed Black A and Diazo Black BH diazotized and developed with Hydroxanil. This method produces greater wash-fastness than when this type of material is dyed with acetate and direct blacks.

Hydroxanil is simple to use—requires no caustic soda. Simply stir into boiling water and add to developing bath.

...Develops Complete in 30 Minutes!

No excess rinsing or soaping required! Two batches dyed in the time usually required for one.

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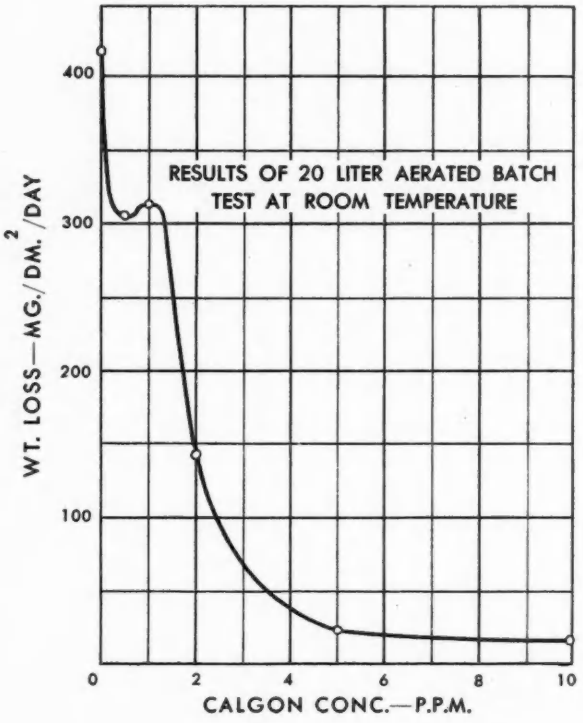
This graph illustrates the effect of various concentrations of Calgon in inhibiting steel corrosion.

This property of Calgon is extremely important in the textile industry, where iron picked up from corroded pipe lines may cause considerable trouble in processing.

Threshold Treatment with Calgon inhibits corrosion, and also prevents precipitation of dissolved iron. This means less danger of iron stains on fabrics and greater efficiency of the peroxide bleach. Colors will be brighter, particularly in wool dyeing. Cotton material processed for rubberizing will also benefit from the reduced iron content of the water.

Calgon in the textile industry saves far more than its cost by reducing the rehandling of goods, cutting the proportion of seconds, and, in some processes, reducing the amount of chemical required.

Our bulletin "Calgon Data for the Textile Chemist" contains full information concerning Threshold Treatment and other textile uses of Calgon. We will be glad to send you a copy.



* *T. M. Reg. U. S. Pat. Off.*

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The New ALL-PURPOSE Synthetic Detergent

MOST EFFICIENT ★ MOST ECONOMICAL

All we ask you to do is to test this new detergent against any other on the market for stability in hard water, wetting-out dispersing, foaming, etc. and then you will see performance that will make you say "what a Product."

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The Detergent that detours trouble

ORATOL L-48

● No guessing when you use Oratol L-48! This sulphonated amide is a powerful detergent with great foaming, emulsifying and wetting properties—gives equally successful results with cotton, wool, silk, rayon, acetates and aralac fibres!

Oratol L-48 is stable in hard water, under acid or alkaline conditions. Its use prevents the formation of insoluble soaps on the surface of dye liquors, and it acts as a dispersing agent for lime soap deposits. As a detergent and scour, in bleaching, dyeing and finishing, Oratol L-48 is outstanding! Priced low, this highly efficient product is well worth your attention. Samples and information on request.

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EASTMAN BLUE BNN

A Dyestuff for Cellulose Acetate Rayon and Nylon

EASTMAN BLUE BNN is a highly dispersed anthraquinone dyestuff which produces neutral shades of blue on cellulose acetate and a somewhat greener shade on nylon. In medium to dark shades, it has very good fastness to light and washing, and is superior in this respect to most anthraquinone blues.

Blue BNN has good solubility, and is recommended for use as a self shade or in combination with other dyes for producing any mode shade requiring a blue component. Unusual build-up and level-dyeing characteristics at either high or low temperatures make possible a saving in dyestuff consumption. Both box and jig may be used.

Eastman Acetate Dyestuffs are available in a wide variety of useful colors for the dyeing of acetate rayon. For further information about these dyestuffs, write to TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

Eastman

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COLOR

color

DEVELOP YOUR COLORS WITH SOLVAY SODIUM NITRITE (U.S.P.)

The secret of quality azo dyes

In azo dyes, a sure way to develop the finest colors is to specify U.S.P. *quality* SOLVAY Sodium Nitrite.

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Stops Gelling

Improves Flow

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When Resloom . . . Monsanto's unique melamine resin for crush-resistant rayon, wool, cotton and their blends . . . was introduced some months ago, it offered a degree of (1) crush resistance, (2) shrinkage control, and (3) lasting stability never before attained in the industry.

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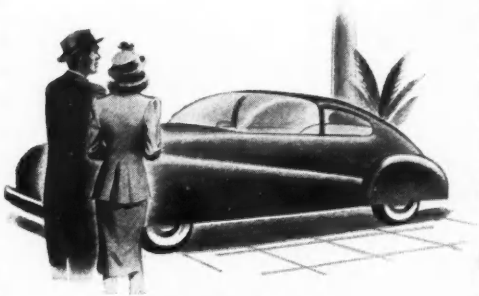

"Constantly Improved, but No Yearly Models"

If you have never discovered what Resloom can do for the textiles you manufacture or use . . . or if you haven't learned *lately* what Resloom will do . . . you owe it to yourself to consult Monsanto's textile chemists at once . . . for samples, technical information, or actual mill trials. Simply write, wire or phone: MONSANTO CHEMICAL COMPANY, Textile Chemicals Department, 140 Federal St., Boston 10, Massachusetts.

Resloom: Reg. U. S. Pat. Off.

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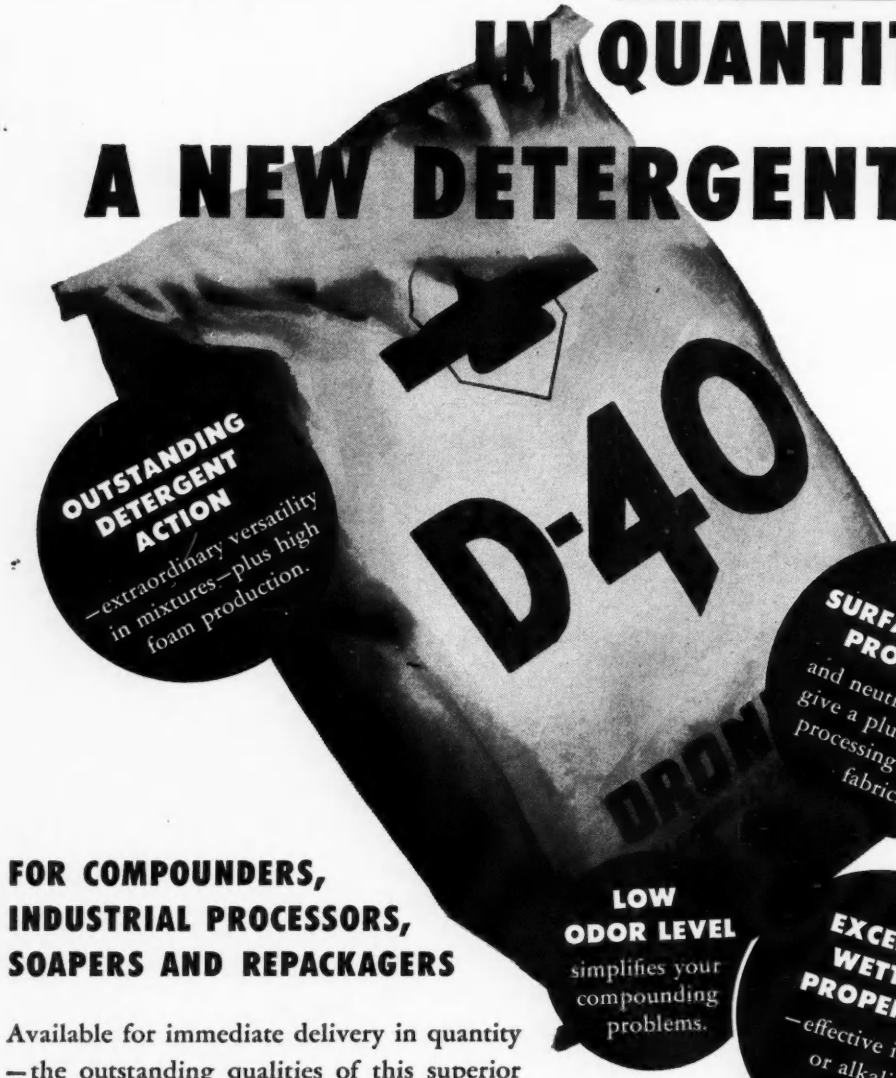
AVAILABLE *NOW!*
IN QUANTITY
A NEW DETERGENT



OUTSTANDING DETERGENT ACTION
—extraordinary versatility in mixtures—plus high foam production.

HIGH SURFACE-ACTIVE PROPERTIES
and neutral character give a plus factor in processing delicate fabrics.

LOW ODOR LEVEL
simplifies your compounding problems.

EXCELLENT WETTING PROPERTIES
—effective in acid or alkaline medium.

FOR COMPOUNDERS, INDUSTRIAL PROCESSORS, SOAPERS AND REPACKAGERS

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America's Leading Synthetic Detergent

COSTS LESS THAN SOAP!

For years the price of NACCONOL NR has gone steadily downward. Today it costs two-thirds less than in 1932! You will continue to benefit by our greater production and technology.

DOES MORE THAN SOAP!

Functions efficiently in acid or alkaline, hot or cold solutions; in hard water; or with metal salts, oxidizing or reducing agents. Combines washing, wetting, emulsifying, dispersing in one economical synthetic detergent.

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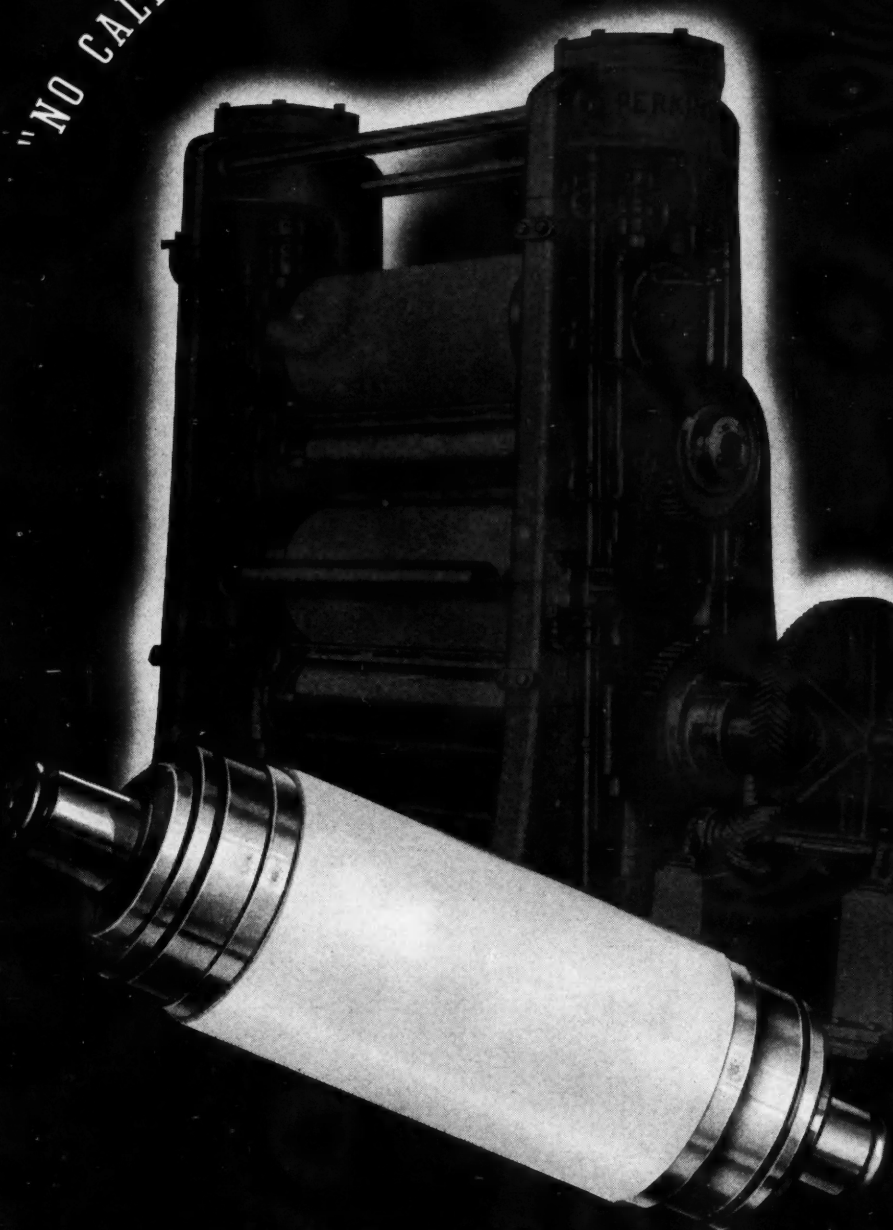

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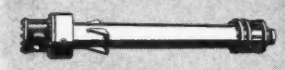

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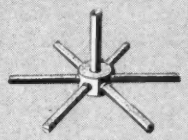

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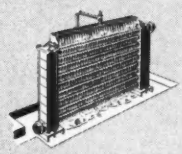

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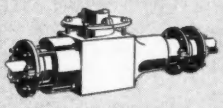
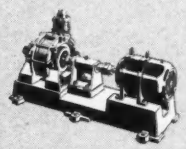
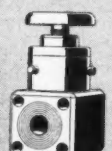


"Karbate" Mixer



"Karbate" Centrifugal Pump



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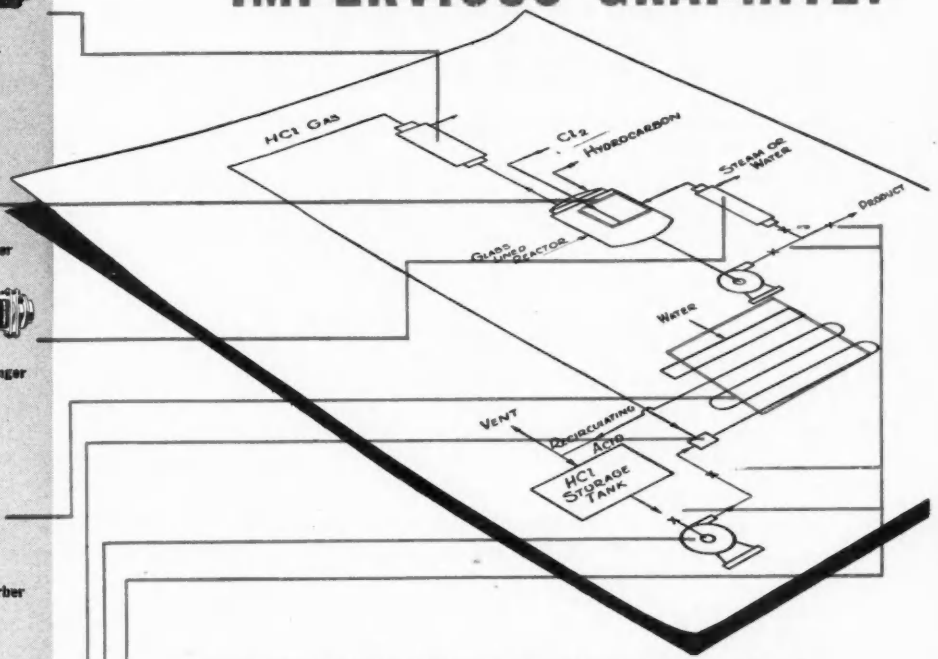

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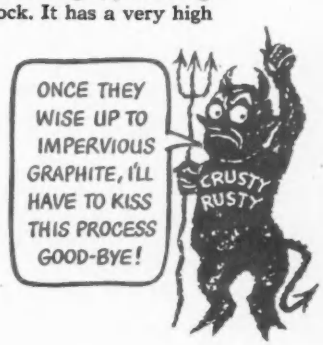

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Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

Published every other Monday by
HOWES PUBLISHING COMPANY, INC.
One Madison Avenue, New York 10, N. Y.

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APRIL 7, 1947

VOLUME 36 NUMBER 7

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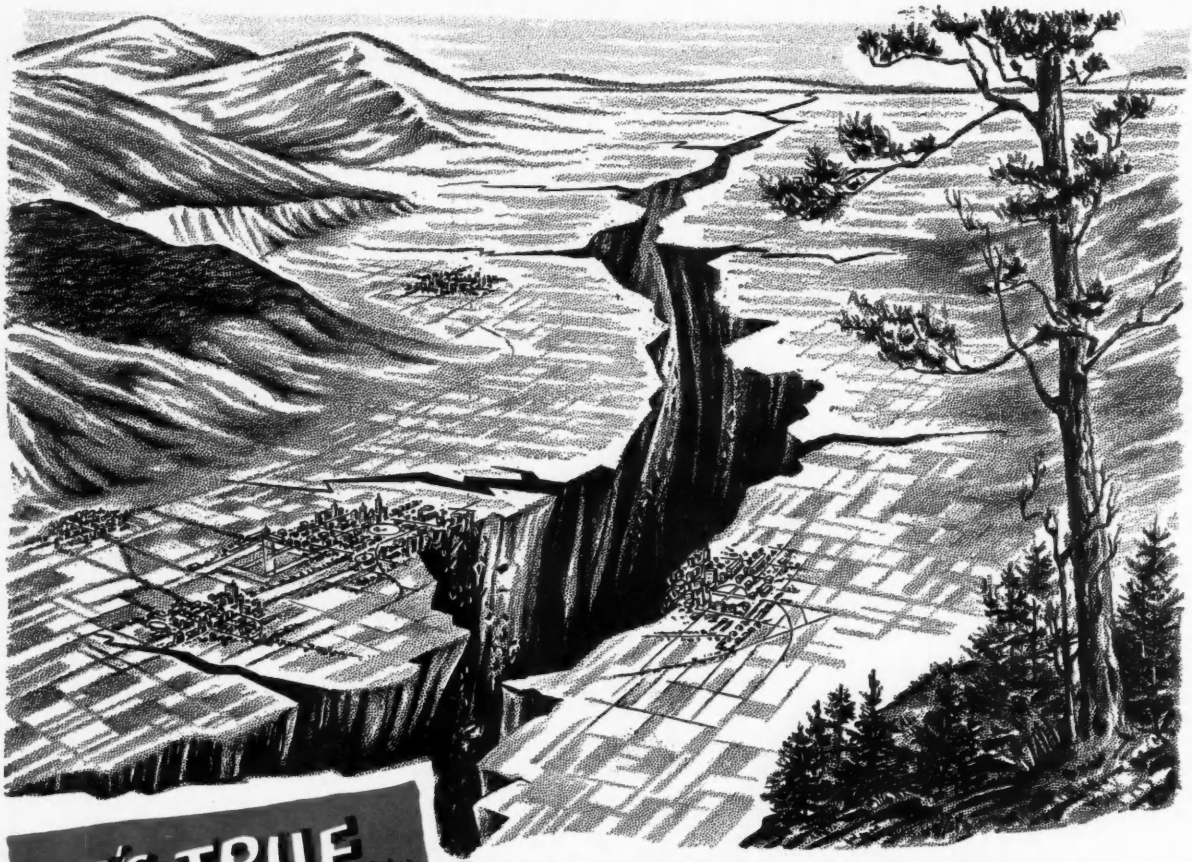

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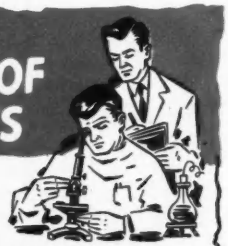

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pril 7, 1947

Proceedings of the
American Association of Textile Chemists and Colorists

APRIL 7, 1947

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Members should notify the Secretary immediately of all address changes

Correction

Re: Research Committee Exhibit Photos

IN our issue of January 27th we ran a number of photos of the exhibit of the Research Committee at the Silver Jubilee Convention in Boston last December. Credit for use of the photos was erroneously given the Massachusetts Mohair Plush Company. These photos were published through the courtesy of the Exhibits Committee of the Silver Jubilee Convention.

—♦ ♦—

Meeting, Philadelphia Section

THE meeting of the Philadelphia Section was held on Friday, February 28, 1947, in the North Roof Garden at the Bellevue-Stratford Hotel.

Edward S. Pierce, Research Engineer, H. W. Butterworth & Sons Company, was the speaker of the evening. His subject was, "Development of Textile Machinery," which was received with much enthusiasm.

There were 150 present for dinner and 160 for the meeting.

Respectfully submitted,

A. E. RAIMO, *Secretary.*

—♦ ♦—

Southeastern Section News

THE Executive Committee of the Southeastern Section met at the Ansley Hotel on February 15 for a meeting to plan the events for this year.

The treasurer, Allyn J. Morse, reported a total of $177.89 in the bank with no outstanding bills. Norman Arnold, chairman of our junior membership reported 12 members in the student organization at the Georgia School of Technology.

It was planned to have four meetings during the year 1947 to be held as follows: March 22, Columbus; June 7, Atlanta; September 13, Columbus; and December 6, Atlanta.

A. Kempton Haynes, chairman, appointed the following committees:

Program Committee, W. B. Griffin; Student Activities Committee, Norman P. Arnold; Membership Committee, Gillespie Smith; Publicity Committee, Howard M. Waddle; Corporate Membership Committee, Norman P. Arnold; Arrangements Committee, George E. Missbach; Intersectional Paper Committee, James D. Dean; Research Committee, James L. Taylor, S. Jack Davis, Walter M. Scott, Howard M. Waddle, Curt Mueller, Leslie Bamberger, R. O. Simmons, M. T. Barnhill, W. B. Griffin, A. K. Haynes.

A vote of thanks was given M. T. Barnhill for his work on the paper for the International Contest for the past two years.

Mr. Griffin announced that the March 22 meeting would be held in Columbus, Georgia, at the Ralston Hotel at 7:00 p. m. G. A. Slowinske gave a paper on water repellent treatments—their application and their evaluation.

Respectfully submitted,

HOWARD M. WADDLE, *Secretary.*

—♦ ♦—

Membership Applications

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Jacques E. Duport—Chem. Engr. & Colorist, Durand & Hugenin, Basle, Switzerland. Sponsors: C. W. Kuhl, C. W. Kuhl, II.

(Continued on Page P165)

CALENDAR

EXECUTIVE COMMITTEE ON RESEARCH
Meetings: May 1 (Lowell, Mass.); June 4.

COUNCIL
Meeting: June 6.

RESEARCH COMMITTEE
Meeting: June 6.

NEW YORK SECTION
Meeting: May 2 (Swiss Chalet, Rochelle Park, N. J.)
Outing: June 20. (North Jersey Country Club).

RHODE ISLAND SECTION
Meeting: April 25.

PHILADELPHIA SECTION
Meetings: April 11, May 23.
Outing: June 13. (Atlantic City Country Club).

NORTHERN NEW ENGLAND SECTION
Meetings: April 11, May 16, September 26, November 21.
Outing: June 13.

SOUTH CENTRAL SECTION
Meeting: April 12. (Patten Hotel, Chattanooga).
[3:00 P.M.—Henry E. Millson, "Dyeing and Handling of Wool." 7:00 P.M.—Dinner: Speaker to be announced.]

PIEDMONT SECTION
Meeting: April 12. (O. Henry Hotel, Greensboro, N. C.)
Outing: June 20 and 21. (Ocean Forest Hotel. Myrtle Beach, S. C.)

MID-WEST SECTION
Meeting: April 12. (Schroeder Hotel, Milwaukee, Wis.)
Outing: June 21. (Lake Lawn, Delavan, Wis.)

SOUTHEASTERN SECTION
Meeting: June 7. (Atlanta, Ga.)

NATIONAL CONVENTION
October 23, 24, 25. (Congress Hotel, Chicago, Ill.)

Intersectional Contest ◆ Second Prize Winner ◆

The Effect of Dyestuffs on the Temperature Rise of Fabrics Exposed to Light*

Presented by the
PHILADELPHIA SECTION

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Dr. E. C. Dreby
Speaker
Dr. Miles A. Dahlen
Judge
Prof. Percival Theel

Abstract

Cotton, viscose rayon and woolen fabrics dyed with dyestuffs exhibiting low infra-red reflectance are increased in temperature on exposure to sunlight more than the same fabrics dyed to approximately the same shade with dyestuffs exhibiting high infra-red reflectance. A laboratory method for measuring the relative temperature rise in fabrics has been devised. As a convenient substitute for sunlight, "Photoflood" lamps may be used as a source of radiation in obtaining qualitative data as to the influence of dyestuffs upon the relative temperature rise in fabrics.

The results indicate that the reflectance characteristics of dyestuffs may have important practical significance in the coloration of fabrics for clothing. Dyestuffs reflecting a high percentage of infra-red radiation will impart more comfort to summer apparel than dyestuffs reflecting a low percentage of infra-red. On the other hand, dyestuffs reflecting a low percentage of infra-red radiation will increase the warmth of winter apparel. The degree of improvement affected by such selection must be ascertained by further study.

Introduction

INFRA-RED radiation has been known to physicists for many years; and mankind has utilized infra-red radiation as a source of heat, even though the popular recognition of this type of radiation has been relatively recent. New and rather spectacular applications of infra-red radiation have been developed in the past decade and particularly during the war years. Among these applications are photography, including taking pictures in the dark, through fog, and at long distance, heating, such as the curing of automotive lacquers and the drying of textiles, and the detection of wartime camouflage. The reader is probably aware of the recent disclosure by the War Department of the "Snooperscope" and the "Sniperscope." These devices, based on infra-red principles, permit military personnel to see and shoot in the dark.

All of these applications stem from the special properties of radiation in the infra-red portion of the spectrum. Infra-red radiation is invisible to the human eye, but can penetrate darkness, fog and other atmospheric conditions restricting vision and is transmitted, absorbed and reflected in specific ratios by all materials. Much of the infra-red radiation absorbed is converted into heat resulting in a rise in the temperature of the absorbing materials.

Physicists have known for a long time that the energy of sunlight reaching the earth's surface is distributed chiefly over the ultra-violet, visible and infra-red regions. Of course, solar radiation is composed of energy in many other spectral regions but these forms of radiation are filtered out by the atmosphere and do not reach the earth's surface in significant amount. The heating effect of sunlight is due to the absorption of radiation principally in the infra-red and, to some degree, in the visible region.

Therefore, in view of the fact that such radiation absorbed by a textile results in a temperature rise, an investigation of the variations in such a rise as related to the light-absorbing characteristics of the dyestuffs used was undertaken. The results would be indicative of the importance of a choice in the selection of dyestuffs for summer wearing apparel in the direction of minimum temperature rise. Likewise dyestuffs applied to tentage, tarpaulins, awnings and other fabrics for outdoor use perhaps should be selected on the basis of their effects on the temperatures of these textiles when exposed to the sun. This aspect of dyestuff selection has received no commercial consideration to our knowledge; and the only scientific study related to this subject which the authors have found was published in England *(1,2)* after this investigation was well under way.

Selection of Fabrics and Dyestuffs

In order that consideration might be given to the principal fibers used in the construction of fabrics to be tailored into garments, three fabrics were selected as standards to which the dyestuffs of specific infra-red reflectance would be applied. A fabric representative of that used for awnings, tarpaulins and tengage was also included. These fabrics were:

(1) Cotton poplin (6.5 ounces per square yard)
(2) Wool flannel (6.4 ounces per square yard)
(3) Delustered viscose rayon lining cloth (2.9 ounces per square yard) and
(4) Cotton duck (11.3 ounces per square yard).

Measurements were made at a wave length of 1000 millimicrons of the reflectance of a wide range of dyestuffs suitable for application to each of these fabrics. This permitted classification of the dyes into groups exhibiting high, medium or low reflectance. Those reflecting 70 per cent or more of the incident radiation at 1000 millimicrons were classified arbitrarily as high, whereas those reflecting 30 per cent or less were classified as low reflecting. None of the direct cotton

* Presented in Intersectional Contest, Silver Jubilee Convention, Boston, Mass., December 13, 1946.

and insoluble azo dyes were found to be low reflecting. However, several vat and sulfur dyes were low reflecting. Thus, it was evident that fabrics composed of cellulosic fibers, e.g., cotton and rayon, could be dyed with either low or high reflecting dyestuffs. On the other hand, all of the dispersed acetate dyes were high reflecting and for this reason no acetate dyeings were included in this study. Of the wool dyes, the chrome blacks and Naphthol Green B were low reflecting. In general, the other azo dyes and the anthraquinone acid dyes were high reflecting. Several dyes of intermediate reflectance were also available.

On the basis of these data, selections were made for each fabric of shades which could be produced with dyestuffs of low reflectance. Dyeings made with these dyes were then approximately matched in daylight with dyestuffs of high infra-red reflectance. All dyeings were made by conventional methods.

Measurement of Temperature

To investigate the possibility of a relationship between the temperature rises of fabrics on exposure to radiant energy and the light-reflecting properties of the dyestuffs applied thereto, a method for measuring the temperature of textile materials had to be devised. Copper plates of identical size (3.0″ x 5.0″ x 0.25″) and weight (475 grams) with well-polished plane surfaces were fabricated and arrangements were made to measure their temperature by the use of sensitive thermocouples. It was found that consistent temperature readings of fabrics could be obtained by wrapping them in single layers around these copper plates. Part of the incident radiation was reflected and part was absorbed by the fabric. Also, some was transmitted through the interstices of the fabric; but, in view of the polished surface of the copper plate, the greatest portion of this radiation was reflected by the plate and, hence, any error due to light transmitted through the fabric was insignificant. This method of measurement, while it may not be absolutely accurate as to the exact temperature of the fabric, did yield relative temperature differences. Direct measurement of fabric temperatures with thermometers, thermocouples woven in the fabrics, and other devices appeared to be less reliable.

The four copper plates were mounted on top of a wooden box in such a manner as to be removable so that they could be wrapped with fabric. The box on which the plates were mounted was exposed at an angle of approximately 45 degrees toward the south between 11:00 A.M. and 1:00 P.M., E.S.T., on clear days during the month of September in Philadelphia. To minimize cooling by air currents the plate assembly was surrounded by a pasteboard wall which extended four inches above the surface of the plates.

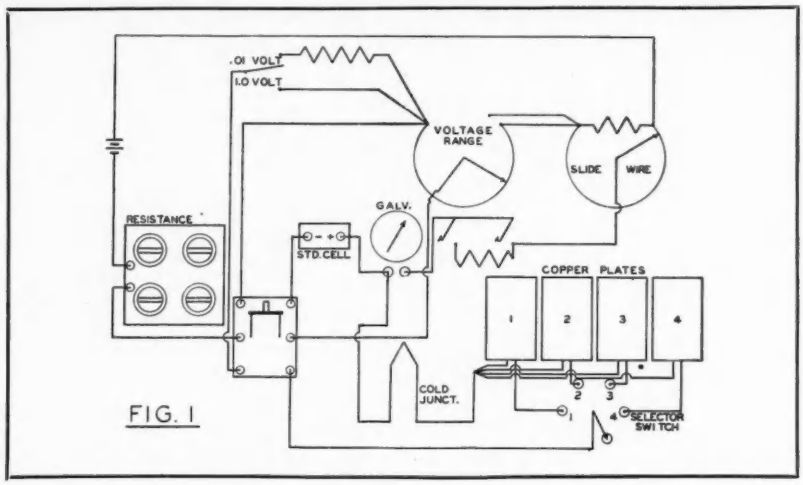


FIG. 1

A copper-constantan thermocouple was imbedded in each copper plate. The four constantan wires, one from each plate, were made common and run to the cold junction contained in a thermos bottle filled with ice. During each experiment, the cold junction was maintained at a constant temperature of 32.0° F. The copper wire from each plate was connected to a selector switch. The leads from the selector switch were connected through a potentiometer circuit (Figure 1) to a Leeds & Northrup galvanometer. The galvanometer lamp was focused on a scale, and in the measurement of temperature the beam of the galvanometer lamp was adjusted to the center of the scale by alteration of the potentiometer resistance as required. The sensitivity of this assembly was such that 1.0° F. was equivalent to four divisions on the potentiometer resistance scale.

In order to obtain comparative results three or four of the plates were used simultaneously to conduct parallel tests. Normally only three plates were required —one for the undyed fabric, one for the low-reflecting dyeing and one for its high-reflecting counter-part. However, the fourth plate was frequently used to examine another dyed fabric not necessarily related to the matched pair. Heat losses from each copper plate were minimized by wrapping the fabric specimen around the copper plate and anchoring its ends on the reverse side by means of "Scotch" Cellulose Tape. Thus, when the plate was mounted on the box, only the face of the fabric was exposed towards the source of radiation.

Temperature Rise on Exposure to Sunlight

In experiments designed to observe the relative rise in the temperature of fabrics on exposure to sunlight, specimens of one of the high-reflecting and low-reflecting matched dyeings, as well as of the corresponding undyed fabric, were mounted on the plates. The temperature of each of the plates with the fabric specimens mounted thereon was measured before exposure and then periodically during exposure. In general, the temperature rise during different time periods of equal length was somewhat irregular due to the variation in the brightness of the sun, atmospheric interferences, etc., but was more or less relative between the fabrics being compared. The appearance of clouds usually forced termination of the exposure. However, in all of the five cases examined both dyed fabrics exhibited a greater temperature increase than the undyed fabric and the low-reflecting dyed fabric exhibited a greater temperature increase than the high reflecting dyed fabric. These data are presented in Table I.

Temperature Rise on Exposure To Artificial Light

While the measurement of the temperature rise caused by the absorption of heat from the rays of the sun was of primary interest in this investigation, it was evident that energy from the sun was not only insufficiently constant in intensity but also available for only brief periods of time. Hence, the selection of

TABLE I
Temperature Rise of Visually Similar Dyeings Under Direct Sunlight

Dye	Fabric	% Reflectance at 1000 mμ.	Air Temp. °F.	Temperature Rise Min.	Temperature Rise °F.	Diff. in Temp. Increase over that of Undyed Fabric, °F.
Undyed	Cotton duck	85.0	86	75	17.5	....
"Pontamine" Brown B1* "Pontamine" Fast Yellow 3GL "Pontamine" Black EBN	Cotton duck	83.9	86	75	22.3	4.8
"Ponsol" Brown BB Paste	Cotton duck	15.7	86	75	34.6	17.1
Undyed	Cotton duck	85.0	81.5	30	10.3	....
"Ponsol" Dark Blue BR Pst.* "Ponsol" Violet RRD Pst.	Cotton duck	56.6	81.5	30	17.2	6.9
"Sulfogene" Direct Blue 2RCF	Cotton duck	9.0	81.5	30	20.3	10.0
Undyed	Viscose Rayon	92.0	73	90	19.5	....
"Pontamine" Black EBN* "Pontamine" Red 12B	Viscose Rayon	79.0	73	90	30.6	11.1
"Ponsol" Direct Black 3G Dbl. Pst.	Viscose Rayon	26.0	73	90	33.3	13.8
Undyed	Wool	86.5	95	75	17.5	....
"Pontacyl" Green NV Extra* "Pontacyl" Light Yellow GX DuPont Orange G "Pontacyl" Carmine 6B	Wool**	62.0	95	75	19.5	2.0
DuPont Naphthol Green B ($CuSO_4$ aftertreated)**	Wool	22.5	95	75	25.1	7.6
Undyed	Wool	86.5	78	50	38.7	....
"Pontacyl" Blue Black RC* "Pontacyl" Violet VR	Wool	70.0	78	50	49.5	10.8
"Chromacyl" Black W	Wool	16.5	78	50	55.2	16.5

* Principal component.
** Drab dyeing.

another source of energy which would overcome these deficiencies of sunlight appeared desirable in order that comparisons could be made in the laboratory independent of the time and/or weather. The very striking similarity between the energy-distribution curve of the high-intensity carbon arc and that of natural sunlight was, of course, recognized *(3)*. However, high-intensity carbon arcs are richer in ultra-violet than sunlight. Also, their intensity is anything but constant and this irregularity has caused the calibration of fading lamps using high-intensity carbon arcs as a light source to be the subject of considerable study *(4, 5* and *6)*.

Because of these objections consideration was given to other sources of artificial illumination. Ultimately, "Photoflood" lamps of the type commonly used today in photography were selected for this purpose. Although the energy distribution curve of radiation from a "Photoflood" lamp does not exhibit as close a similarity toward that of sunlight as the high-intensity carbon arc, it presents advantages in that its spectrum, while lacking in ultra-violet and violet, is continuous and contains visible as well as infra-red radiation. Also, the fact that the "Photoflood" lamp is actually richer in infra-red radiation than sunlight at the earth's surface makes it particularly adaptable to this investigation.

Accordingly, two Wabash 300-watt "Photoflood" lamps were suspended above the four copper plates which were mounted on top of the wooden box. The box was placed in such position that the incident radiation from these lamps was normal to the plates. The position of the plates and lamps was further adjusted so that the central axis of the beam from one lamp fell between the first and second plates and the central axis of the other lamp between the third and fourth plates. This arrangement is illustrated in

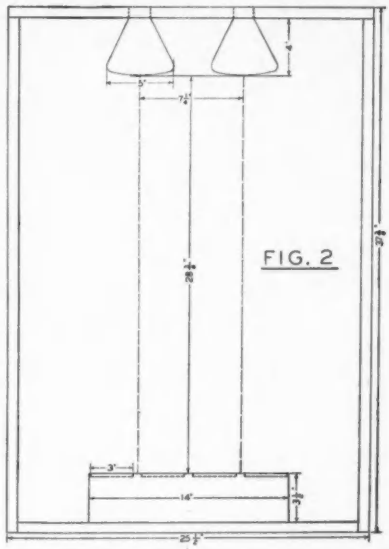


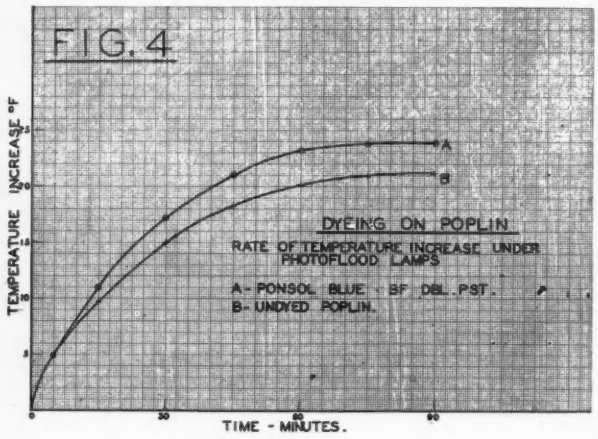
Figure 2. The complete assembly of the apparatus appears in Figure 3.

Initially, the intensity of illumination received on each plate from the "Photoflood" lamps was measured with a General Electric foot-candle meter and was found to be the same for each plate within ∓ 1.0 per cent. To determine what effect this slight variation would have in the temperature rise from plate to plate, each plate was covered with undyed cotton duck and exposed for 95 minutes. The data from this experiment which are presented in Table II show that the maximum difference in temperature rise between any pair of plates was 0.65°F. in a total temperature rise of approximately 20°F.

TABLE II
Variation in "Photoflood" Illumination Between Plates
(Each plate covered with undyed cotton duck)

	Initial Temperature °F.	Temperature after 95-min. Exposure: °F.	Temperature rise in 95 min. °F.
Plate I	79.2	99.5	20.30
Plate II	80.0	100.25	20.25
Plate III	79.6	100.25	20.65
Plate IV	80.0	100.00	20.00

In temperature-rise experiments with dyed fabrics under "Photoflood" illumination, as in the experiments with the fabrics exposed to direct sunlight, specimens of one of the high-reflecting and low-reflecting matched dyeings, as well as of the undyed fabric, were mounted on the plates. In some cases, a fourth dyeing unrelated to the matched pair other than being on the same fabric was mounted on the fourth plate. The tem-



perature of each of the plates on which the respective fabric specimens were mounted was measured before exposure and then periodically during exposure. As indicated in Figure 4, the rate of temperature rise on exposure was greatest initially and decreased progressively until, in general, after 60 minutes it was very small. In this extended region the temperature rise curve was becoming asymptotic. Nevertheless, the experiments were carried out with exposures of 90 minutes to assure that the rate of temperature rise for each comparative fabric was in the asymptotic region.

Therefore, 90-minute experimental exposures were made on various pairs of dyed fabrics. The total temperature rise of each dyed fabric is given in Table III. The dyed fabrics in each group were exposed simultaneously with the undyed fabric. However, in view of deviations in room temperature, comparisons between dyeings of different groups are not considered reliable. Nevertheless, in every pair of visually similar dyeings examined, the temperature rise of the dyed fabric exhibiting a low reflectance at 1000 millimicrons exceeded that of its high-reflecting counter-part. In some cases, the magnitude of this difference was surprisingly great.

Discussion of Results

The temperature rise in fabrics exposed to light, of course, is due to that portion of the incident light of all wave lengths which is absorbed and converted into heat. The energy of the radiation varies from wave length to wave length in the spectrum both in daylight and under "Photoflood" lamps.

As a preliminary expedient, in this study, the dyestuffs were classified as to absorption or reflectance on the basis of

TABLE III

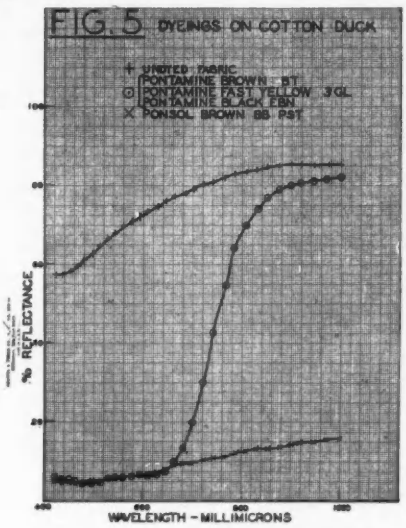
Temperature Rise of Visually Similar Dyeings Under "Photoflood" Illumination

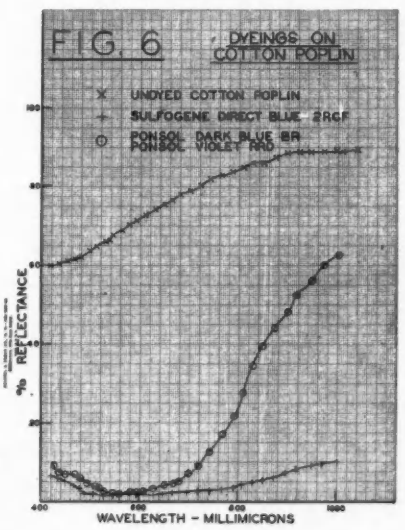
Dye	*Fabric*	*% Reflectance at 1000 mμ.*	*Air Temp. °F.*	*Temperature Rise 90 Min. °F.*	*Difference in Incr. Over Undyed Fabric, °F.*
Undyed	Cotton Poplin	89.0	76	28.4	....
"Ponsol" Dark Blue BR Pst.* "Ponsol" Violet RRD Pst.	Cotton Poplin	62.5	76	32.9	4.5
"Sulfogene" Direct Blue 2RCF	Cotton Poplin	10.2	76	35.1	6.7
Undyed	Cotton Duck	85.0	81.5	27.9	....
"Ponsol" Dark Blue BR Pst.* "Ponsol" Violet RRD Pst.	Cotton Duck	56.5	81.5	30.2	2.3
"Sulfogene" Direct Blue 2RCF	Cotton Duck	9.0	81.5	35.6	7.7
Undyed	Cotton Poplin	89.0	78	26.0	....
"Sulfanthrene" Black PR Dbl. Pst.* "Ponsol" Golden Orange RRT Pst. "Ponsol" Flavone GC Dbl. Pst.	Cotton Poplin	46.6	78	27.4	1.4
"Ponsol" Direct Black 3G Dbl. Pst.	Cotton Poplin	30.1	78	39.4	13.4
Undyed	Cotton Duck	85.0	75	27.4	....
"Sulfanthrene" Black PR Dbl. Pst.* "Ponsol" Golden Orange RRT Pst. "Ponsol" Flavone GC Dbl. Pst.	Cotton Duck	40.8	75	31.0	3.6
"Ponsol" Black 3G Dlb. Pst.	Cotton Duck	27.0	75	36.8	9.4
Undyed	Cotton Poplin	89.0	77	24.3	....
"Pontamine" Brown BT* "Pontamine" Fast Yellow 3GL "Pontamine" Black EBN	Cotton Poplin	88.0	77	21.2	—3.1****
"Ponsol" Brown BB Pst.	Cotton Poplin	16.0	77	40.1	15.8
Undyed	Cotton Duck	85.0	76	27.0	....
"Pontamine" Brown BT* "Pontamine" Fast Yellow 3GL "Pontamine" Black EBN	Cotton Duck	82.0	76	28.8	1.8
"Ponsol" Brown BB Pst.	Cotton Duck	16.0	76	37.2	8.9

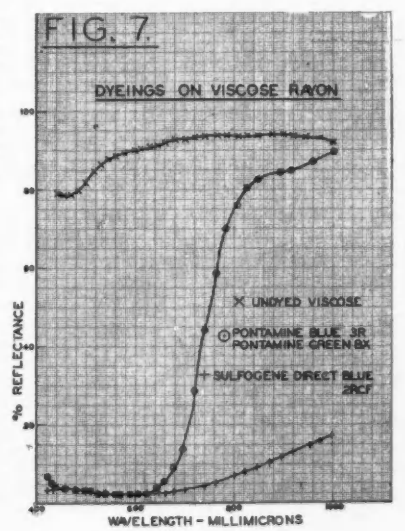
TABLE III (Continued)

Dye	Fabric	% Reflectance at 1000 mu	Air Temp. ° F.	Temperature Rise 90 Min. ° F.	Difference in Incr. Over Undyed Fabric, ° F.
Undyed	Viscose Rayon	92.0	82.5	21.1	....
"Pontamine" Blue 3R * / "Pontamine" Green BX / "Sulfogene" Direct Blue 2RCF	Viscose Rayon	85.0	82.5	23.4	2.3
	Viscose Rayon	17.5	82.5	29.3	8.2
Undyed	Viscose Rayon	92.0	90	20.7	....
"Pontamine" Black EBN* / "Pontamine" Red 12B / "Ponsol" Direct Black 3G Dbl. Pst.	Viscose Rayon	79.0	90	21.1	0.4
	Viscose Rayon	26.0	90	27.5	6.8
Undyed	Wool	86.5	82	23.7	....
"Pontacyl" Green NV Ex.* / "Pontacyl" Light Yellow GX / DuPont Orange G / "Pontacyl" Carmine 6B	** Wool	62.0	82	28.4	4.7
DuPont Naphthol Green B ($CuSO_4$ aftertreated)**	Wool	22.5	82	33.8	10.1
Undyed	Wool	86.5	79	21.8	....
"Pontacyl" Green NV Extra* / "Pontacyl" Light Yellow GX / DuPont Orange G / "Pontacyl" Carmine 6B	*** Wool	68.0	79	30.0	8.2
Du Pont Naphthol Green B***	Wool	16.5	79	35.0	13.2
Undyed	Wool	86.5	83	20.8	....
"Pontacyl" Blue Black RC* / "Pontacyl" Violet VR / "Chromacyl" Black W	Wool	70.0	83	27.6	6.8
	Wool	16.5	83	30.4	9.6

* Principal component.
** Drab Shade.
*** Pullman green shade.
**** Anomalous result which should be rechecked.





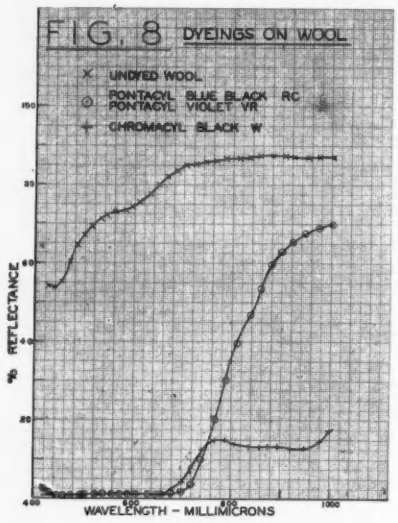


their behavior at 1000 millimicrons. Although this measurement is roughly indicative of the temperature rises to be expected, a truly accurate comparison of two colored surfaces, such as colored textiles, is obtained only by determining the reflectance over the entire light spectrum. It appeared desirable to compare the overall reflctances of some of the fabrics in this study with the reflectances at 1000 millimicrons to determine the relative accuracy of the use of this monochromatic line for predicting thermal behavior.

General Electric spectrophotometers are available for measuring reflectance from 400 to 700 millimicrons and from 700 to 1000 millimicrons. The particular General Electric spectrophotometer used in this study measured reflectance between the wave lengths of 423 and 1000 millimicrons. By means of this instrument spectral reflectances were obtained for two brown dyeings on cotton duck, two navy dyeings on cotton poplin, two navy dyeings on viscose rayon and two black dyeings on woolen flannel, as well as for the corresponding undyed fabrics (Figures 5 to 8).

The area under each curve (Figures 5 to 8) represents the proportion of the total incident radiation reflected by the fabric between the wave lengths of 423 and 1000 millimicrons. These areas in arbitrary units, the reflectances at the monochromatic line of 1000 millimicrons and the temperature rises observed on exposure of the fabrics to light, are compared in Table IV for the four pairs of fabrics.

Radiation from the sun is distributed over virtually the entire spectrum. The distribution of solar energy is illustrated in Figure 9 (7). Approximately 63 per cent of the energy in this spectrum is between the wave lengths of 400 and 1000 millimicrons. However, because of the filtering out of substantially all of the radiation beyond 1350 millimicrons and much of that between 1000 and 1350 millimicrons by atmospheric water vapor, nearly all of the sunlight energy falling on objects at the earth's surface is in the



region studied. In other words, the heat rise of the fabrics considered in this investigation, when exposed to the sun, is due chiefly to radiation in the 400-1000 millimicron band.

It is recognized, of course, that the data in Table IV do not represent reflectance in energy units. Since the distribution of energy in the solar spectrum varies from day to day with atmospheric conditions, it is impossible to determine accurately the relative amount of energy reflected by each dyed fabric without an elaborate series of physical measurements. However, ignoring atmospheric absorption, energy reflectance for the two brown dyeings on cotton duck, as well as for the undyed cotton duck, have been calculated from the solar distribution curve (Figure 9) by well known physical methods and the resulting curves plotted (Figure 10) and integrated. These calculations were made in arbitrary units since such units suffice for comparative purposes. The results obtained are contrasted in Table V with the areas under the corresponding spectral reflectance curves.

Summary

Obviously this study is preliminary in nature. Nevertheless, it indicates to a striking degree the fact that the use of dyestuffs of low versus high reflectance characteristics, particularly in the infrared region, results in substantially different thermal behavior upon exposure either to sunlight or strong artificial illumination. The fact that the same cotton

TABLE IV

Comparison of Monochromatic and Integrated Reflectances with Temperature Rise of Fabrics

Dyestuff	*Fabric*	*Temperature Rise* — *Sunlight Exposure* — *Min.*	*Sunlight Exposure* — °F.	*90-min. "Photoflood" Exposure* — °F.	*% Reflectance at 1000 mu.*	*Integrated Reflectance 423—1000 mu.* — *Arbitrary Units (29,000 in incident)*	%
Undyed	Cotton Duck	75	17.5	27.0	85.0	23240	80.1
"Pontamine" Brown BT* / "Pontamine" Fast Yellow 3GL	Cotton Duck	75	22.3	28.8	82.0	11165	38.5
"Pontamine" Black EBN / "Ponsol" Brown BB Pst.	Cotton Duck	75	34.6	37.2	16.0	2850	9.8
Undyed	Cotton Poplin	....	....	28.4	89.0	22590	77.9
"Ponsol" Dark Blue BR Pst.* / "Ponsol" Violet RRD	Cotton Poplin	....	....	32.9	62.5	6100	21.0
"Sulfogene" Direct Blue 2RCF	Cotton Poplin	....	....	35.1	10.2	1270	4.4
Undyed	Viscose Rayon	....	....	21.1	92.0	26250	90.5
"Pontamine" Blue 3R* / "Pontamine" Green BX	Viscose Rayon	....	....	23.4	85.0	11025	38.0
"Sulfogene" Direct Blue 2RCF	Viscose Rayon	....	....	29.3	17.5	1770	6.1
Undyed	Wool	50	38.7	20.8	86.5	22650	78.1
"Pontacyl" Blue Black RC* / "Pontacyl" Violet VR / "Chromacyl" Black W	Wool	50	49.5	27.6	70.0	6690	23.1
	Wool	50	55.2	30.4	16.5	1800	6.2

* Principal component.

TABLE V

Comparison of Integrations of Spectral Reflectance and Energy Curves for Brown Dyeings on Cotton Duck

	Integrated Reflectance — *Units**	%	*Integrated Energy* — *Units***	%
Undyed Duck	23240	80.1	25585	72.4
"Pontamine" Brown BT / "Pontamine" Fast Yellow 3GL	11165	38.5	10550	29.9
"Pontamine" Black EBN / "Ponsol" Brown BB Pst.	2850	9.8	3085	8.7

* 29,000 units in incident light.
** 35,380 units in incident energy.

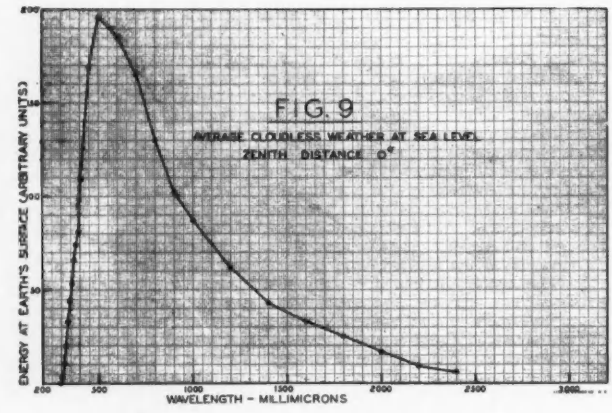
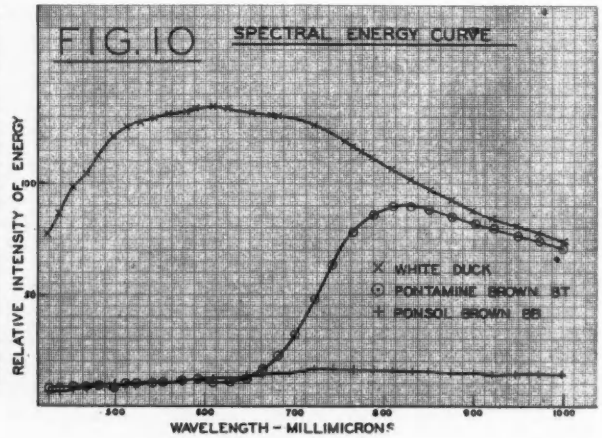


FIG. 9
AVERAGE CLOUDLESS WEATHER AT SEA LEVEL
ZENITH DISTANCE 0°
ENERGY AT EARTH'S SURFACE (ARBITRARY UNITS)
WAVELENGTH – MILLIMICRONS



fabrics dyed to approximately the same shade when exposed to light will vary several degrees in temperature depending upon the reflectance characteristics of the dyestuffs may have important practical significance. In view of the fact that this work was carried out at summer temperatures, it is apparent that cotton and rayon clothing can vary several degrees under these conditions due to the reflectance characteristics of the dyestuffs alone. The same factor can similarly influence the temperatures inside tents, below awnings and under tarpaulins. Considering woolen garments where warmth rather than coolness is usually desired, differences of as much as five degrees can be expected by the selection of dyestuffs of low versus high reflectance.

A thoroughly accurate and scientific study of this topic would require elaborate physical equipment and a very large amount of research on the part of physicists and physical chemists. It is acknowledged that the work reported in the present paper is far from accurate as to the absolute values reported. However, the data are so consistent and so completely in line with predictions based on well established physical principles that the data must be qualitatively correct. It is hoped that the report of this preliminary investigation will induce others to study the subject more thoroughly, particularly from the angle of determining whether human comfort in clothing can be improved by intelligent selection of dyestuffs on the basis of their reflectance characteristics.

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Membership Applications

(Continued from Page P158)

Edmund Eismann—Text. Chemist, Franklin Process Co., Providence, R. I. Sponsors: E. K. Johnson, R. W. Joerger.

William A. Endriss—Research Chemist, Wyandotte Chemicals Corp., Wyandotte, Mich. Sponsors: P. Theel, C. Monego.

Franklin Fairey—Dyer, Hillcrest Hosiery Mills, Inc., Durham, N. C. Sponsors: R. H. Smith, J. W. Van Loan.

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Walter K. Fricke—Asst. Dept. Head, General Aniline Works, Grasselli, N. J. Sponsors: J. A. Hennessey, J. R. Bonnar.

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Leonard Girling—Dyer, Arthur Bone, Inc., Los Angeles, Calif. Sponsor: F. P. Brennan.

Robert N. Golub—Chemist-Colorist, Alanjo, Inc., New Bedford, Mass. Sponsors: B. Verity, J. Pilkington.

Charles R. Goss, Sr.—Dyer, Fairforest Finishing Co., Spartanburg, S. C. Sponsors: N. Balamoutis, R. J. Beauregard.

Conrad J. Goulet—Dyer and Finisher, Shefford Woollens, Ltd., Granby, Canada. Sponsors: J. E. Travers, J. J. Murphy.

Paul F. Haddock—Salesman, American Cyanamid Co., Charlotte, N. C. Sponsors: J. D. Hunter, Q. M. Rhodes.

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David D. Hay—Supt. of Dyeing, Martland Spinning Mills, Ltd., Listowel, Ont. Canada. Sponsors: W. H. Turner, W. E. Durgin.

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Paul F. Noonan—Chemist, National Dyeinf & Finishing Corp., Los Angeles, Calif. Sponsors: S. Springer, F. P. Brennan.

Hubert W. O'Briant—Dyer, National Dyeing & Finishing Co., Los Angeles, Calif. Sponsors: S. Springer, F. P. Brennan.

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Joseph A. Orlando—Text. Colorist, American Cyanamid Co., Calco Chem. Div., Bound Brook, N. J. Sponsors: R. P. Sleeper, H. Weiss.

Juan A. Ornelas—Foreign Branch Mgr., Colloids, Inc., Mexico, D. F. Sponsors: A. Katz, O. A. Anderson.

Drewry C. Payne—Asst. Dyer, Dundee Mills, Inc., No. 1, Griffin, Ga. Sponsors: H. G. Smith, W. R. Jones.

Leslie B. Poland—Chemist, General Aniline & Film Corp., General Aniline Works Div., New Lork, N. Y. Sponsors: G. E. Cohen, W. A. Wieland.

(Continued on Page P175)

Intersectional Contest ◆ Third Prize Winner ◆

The Replacement of Starch in the Finishing of Textile Fibers and Fabrics*

Presented by the
RHODE ISLAND SECTION

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Judge
William H. Cady

STARCH and its closely related natural products, the gums, have been the most widely used sizing and finishing materials for yarns and fabrics. Paralleling the trend in so many other industries, there has been a trend in the textile industry to replace starches and gums by synthetic products. This trend had not previously assumed large proportions, due to the normally low price and large supply of starch. However, war-occasioned shortages and dislocations of the normal channels of trade have made the starch and gum situation so chaotic that the textile industry is turning more and more to synthetic materials of more dependable supply, even if at higher prices.

It is the purpose of this paper to classify the various important properties of starch and other finishing materials, and to indicate for a group of new and promising resins their salient advantages and possible applications.

Today, the latest additions to this resin picture are certain new water soluble alkyd and styrene resin compounds, which may be used in the production of either durable or non-durable finishes in textile fibers and fabrics. These materials are normally synthesized in powder form, are white or slightly creamy in color, have excellent stability to storage, are readily soluble in water and alkali and the application methods are the same as for the conventional starch finishes. Under favorable conditions when such resins are applied to cotton or rayon fabrics, tensile strength remains unimpaired, the wearing qualities are improved, dyestuff shades are unaltered and light fastness properties of the dyed or printed shades remain unchanged.

From laboratory and plant trials it is concluded that these new styrene and alkyd type resins may be used economically for fabric finishing, giving results equal to those obtained with the usual finishing materials. In combinations these same two types of resins may be used with urea-formaldehyde, melamine-formaldehyde, and with a quaternary ammonium compound to produce a new range of durable finishes.

Physical and Chemical Properties of Finishing Materials

The advent of resins, particularly the urea-formaldehyde type, for creaseproofing spun rayons and light weight cotton fabrics in the early 1930's served as a milestone in the textile finishing industry. Later in the same decade, certain acrylate and alkyd resin types were introduced, marking a definite advance in the large scale use of synthetic resins for the replacement of starch in the finishing of textile fibers and fabrics. During the past five or six years, we have witnessed the widespread use of melamine, vinyl and even some styrene types for special purpose finishes but there has been no material that may be classified as a generally satisfactory replacement of starch.

A survey was made of a large number of natural and synthetic materials, listing the various characteristic physical and chemical properties that were considered to be most important to the textile finishing industry (See Chart I of Appendix). A careful sifting of all potential replacements of starch was made in a search to discover those, either new or old, which might be deserving of further study. Laboratory investigations proved conclusively that replacements which fell into this category were indeed few and far between.

It may be well at this point to stress those particular properties which this committee felt to be of paramount importance in any new product that might be used as a starch replacement. For convenience, we have listed such properties in their suggested order of importance in the table below:

A. Good availability at a reasonable cost.
B. No reaction as a skin irritant or sensitizer.
C. Ready removability from fiber or fabric.
D. Tensile strength should not be impaired.
E. No effect on printed or dyed shades.
F. No effect or an improvement in the light fastness of dyestuffs applied textile materials.
G. No yellowing of white goods.
H. No odor development in finished fabrics.

Working with the above list as a criterion, we discovered in our extensive survey of materials that only two new types of products showed any great promise of success in meeting these rather stringent specifications. These two newcomers to the textile finishing industry are the water soluble styrene and alkyd resin compounds. Several products in each category were laboratory tested thoroughly before the decision was reached to confine further efforts in this investigation to the study of the most promising modification of each resin type.

Water Soluble Styrene Resin

Paddings of the water soluble Styrene type resin in two to seven per cent concentrations were made on both cotton and rayon fabrics. Details of the experimental work are given in the Appendix.

* Presented in Intersectional Contest, Silver Jubilee Convention, Boston, Mass., December 13, 1946.

It was found that there was no effect on tensile strength of either cotton or rayon. Stiffness as judged by hand was increased to a degree comparable with starch. A five per cent starch finish was judged equivalent to two per cent styrene resin on the same fabric.

Abrasion resistance, as measured by the Taber Abraser, was measurably increased. A series of fabrics dyed with representative dyestuffs were treated with styrene resin and their fastness properties evaluated. No change in shade was noted, but on the rayon alone the presence of the styrene increased the depth from 10 to 25 per cent. Fade-Ometer tests of 40 to 80 hours showed no effect on the light fastness. Applications on white cloth showed very slight yellowing at a three per cent concentration of styrene, and noticeable yellowing at seven per cent, but this may be corrected easily by blueing. The stability of the finish was tested by ageing for two weeks and no odor development or shade change was noted. Preliminary tests indicated that this resin was not a skin irritant. The styrene finish alone was removed by one No. 1 AATCC wash test, and its wash resistance was not improved by curing. Preliminary trials of the styrene resin combined with urea-formaldehyde and with melamine-formaldehyde, and cured, showed excellent durability. These combinations showed enough promise to lead to further work and are reported in more detail in a later section of this paper.

Water Soluble Alkyd Resin

The soluble alkyd resin compound in several representative concentrations was applied to both cotton and rayon fabrics (See Appendix).

Results indicated that even at 10 per cent resins solids, there was no appreciable increase in warp tensile strength, but the filling figure showed an improvement of at least 20 per cent. On the other hand the tests for elongation at break at the 10 per cent concentration were from 40 per cent to 60 per cent higher than those for the untreated cloth.

Stiffness as judged by hand indicated that three per cent of this resin type compound was the equivalent of five per cent starch. The application of twice as much of the material to the fabric increased the degree of stiffness in like proportion.

Abrasion resistance, as measured by the Taber Abraser, was measurably increased. Light fastness tests showed conclusively that the alkyd resin compound had no adverse effect on this property of a representative group of dyed and printed colors. No change in shades of either cottons or rayons was noted. Applications on white fabric showed practically no yellowing up to three per cent concentration, but distinct at eight per cent. This defect is easily remedied by the proper application of blueing. The stability of the finish was tested by ageing for two weeks and no odor or change in shade was noted. Preliminary tests indicated that this resin was not a skin irritant. The alkyd finish alone was removed by one No. 1 AATCC wash test, and its wash resistance was not improved by curing. Preliminary trials of the alkyd resin combined with urea-formaldehyde and with melamine-formaldehyde, followed by curing showed excellent durability. These combinations as in the case of the styrene resin showed enough promise to lead to further work and are reported in more detail in a later section of this paper.

Combinations to Increase Durability

Since each of these two types of resin compounds under study has a composition that lends itself to further polymerization, combination with other products or to cross-linking polymerization, a study was instituted to determine the value and advantage of such properties. After extensive laboratory testing of many materials, it was clearly indicated that within the scope of our investigations, it would be necessary to limit ourselves to the evaluation of the following combinations, which we hoped and fully expected would yield durable finishes, rather than the non-durable results which we have reported in the previous pages:

A. Water soluble Styrene Resin Compound plus U-F Resin (mixture of mono and dimethylol urea).
B. Water soluble Styrene Resin Compound plus M-F Resin (methylated trimethylol melamine).
C. Water soluble Styrene Resin Compound plus a Quaternary Ammonium Compound.
D. Water soluble Alkyd Resin Compound plus U-F Resin.
E. Water soluble Alkyd Resin Compound plus M-F Resin.
F. Water soluble Alkyd Resin Compound plus a Quaternary Ammonium Compound.

Plant trials were run on four of the above combinations, B, C. E, and F, using a linen type spun rayon and several cotton fabrics. Full confirmation of the laboratory findings was obtained from tests on these plant run fabrics. The results are given in the Appendix.

To give the judges a fuller appreciation of the hand qualities obtainable with these resins and their combinations, a collection of sample swatches taken from the plant run fabrics was included as an appendix in the original paper, and sample yardages of these materials were exhibited at the Silver Jubilee Convention.

Only a single type of calendering was applied to these fabrics to obtain comparable results, but it is understood that the experienced finisher would be able to modify this hand to a considerable degree by other mechanical treatments, and so obtain the particular result desired.

A. The styrene resin in solution mixes readily with the urea-formaldehyde type resin to yield uniform blends of good stability. The method of application in the laboratory or plant is exactly the same as for the urea-formaldehyde resin alone.

These combinations on cottons and spun rayons have good durability to laundering, have comparatively little effect on dyed or printed shades, and are notable for their good resistance to abrasion. Within reasonable limits, crease resistance is not affected.

B. Solutions of styrene resin may be mixed with melamine-formaldehyde to produce stable application baths. Finishes developed with such combinations are satisfactory for both cottons and spuns. In general, good durability to laundering is achieved on both fibers, and shade changes are about the same as with the melamine-formaldehyde alone. It is well known that urea-formaldehyde and melamine-formaldehyde resins cause a loss in abrasion resistance on spun rayons. Combinations of these products with the styrene compound reduced this loss to a minimum and in some cases showed an actual gain.

C. In our search for compounds which would tend to fix the styrene resin, the discovery was made that a quaternary ammonium compound had the power to combine in such a manner as to yield excellent durability. Cottons and spuns may be finished either by a single bath, or by a two bath process.

D. Combinations of the water soluble alkyd compound with the urea-formaldehyde resin produced results similar to those obtained with the styrene-urea formaldehyde mixture in respect to abrasion resistance, crease resistance, light fastness, and launderability.

E. Mixtures of the water soluble alkyd resin with melamine-formaldehyde resin yielded durable finishes on cottons and spuns. Like the styrene resin, the alkyd showed a surprising ability to counteract the decrease in abrasion resistance on spuns produced by melamine-formaldehyde resin.

F. In sharp contrast to the combination of styrene resin with the quaternary ammonium compound, the corresponding mixture of the latter with the alkyd resin resulted in resin precipitation in the bath. Because of this fact, a two bath process was used to produce the desired results.

Warp Sizing

A very considerable part of all the starch consumed in the textile industry is used for sizing of yarns in preparation for weaving. Since this part is several times larger than the amounts used in finishing of textiles, with which this paper is mainly concerned, it was deemed very desirable to investigate the possibility of application of starch extenders or starch substitutes in finishing to the larger field of warp sizing. The evaluation of a warp-sizing compound, however, is far more difficult to undertake in the laboratory than is a finishing compound. As a matter of fact, any tests made in the laboratory on a sized yarn, such as tensile strength, elongation, break, handle, "fingernail test," etc., furnish valuable clues to an experienced operator as to likely performance of such sized yarn in the loom, but the final, and only reliable, test is the actual running of the yarn in the loom for an extended period of time, while watching at the same time the behavior of the loom, shedding of fibers, humidity of the air, breaks, etc., in short, loom efficiency. As can readily be seen, this procedure is rather time consuming and a weaver who is bent on production is rather reluctant to experiment with untried sizes, unless he has a fair assurance of at least passable results without too much lost time for a shut down and spoiled cloth due to improper sizing. Another obstacle in testing new warp sizes is the time element. Very often a warp is sized in the slasher long before the beam reaches the loom, and comparable results are not obtained unless the same yarns are used for comparison, and the same loom at the same relative humidity.

Finally, only limited quantities of products, which have been found to show promise in the finishing of textiles as such, or in conjunction with starch or other products, were available at the time of this investigation. It was for these reasons that it was decided to limit ourselves to a few exploratory trials in the field of wrap sizing, and to leave further work, if promising, to the people most interested in this field.

In setting up a laboratory plan for testing the various products, namely, starch, water-soluble styrene resin, and water-soluble alkyd resin, it was immediately realized that, within the time alloted, it was almost impossible to determine in advance the best possible combination of components for any fiber, let alone the combinations for a variety of fibers or fiber mixtures. It was also realized that it would serve no useful purpose to compare, for instance, a starch sized cotton yarn with a starch sized acetate yarn, since starch is never used on acetate. Furthermore, starch alone is very seldom, if ever, used alone even on cotton, but starch sizes contain generally also softeners, dextrines, humectants, etc. These same additions, as used with starch, might not work equally well with the polystyrenes or polyalkyds, not in the same proportions, or not at all. In another part of this paper, it has been found that in finishing, four parts of the soluble styrene type resin are about equivalent to 10 parts of starch, as far as stiffness of hand is concerned. It was, therefore, decided to compare only straight products on four different fibers; cotton, rayon, acetate and wool. None of these size trials were expected to produce a yarn with suitable properties for weaving. On the other hand, subsequent physical tests of the yarns made after the trial runs would reveal the characteristics of each product, not influenced by any other factors. For the same reason, no other tests than breaking strength and elongation at break were made of each yarn, both unsized and sized with the three products in question. The test data, as well as photographs, of the sized and unsized yarns are given in the Appendix.

The figures seem to show that at the given concentrations corn starch increases the tensile strength of all yarns, excepting acetate, by the highest percentage. None of the products tried seemed to be of any benefit to acetate. The soluble alkyd and styrene resins offer some promise with cotton and wool, while rayon and acetate do not show any improvement with these two products. It has to be remembered, however, that all yarns after sizing were too soft. It is entirely conceivable that an increase of either resin alone or in conjunction with starch or some other modifying agent in the size mix might shift these values to a considerable extent. To sum it up, the only valid conclusion reached in these trials is that both the styrene and the alkyd resins show definite possibilities by themselves, or in combination with other products, in the sizing field; and that considerable work has still to be expended to determine the proper factors conducive to optimum results, not only for each class of resin but also for each type of fiber.

Mill Trials on Warp Sizing

Styrene resins have been used with success on worsted yarns in mill scale sizing trials, either alone or in combination with starch. Due to their water insolubility, they are dispersed by means of sodium hydroxide or carbonate at the boil and the resulting product is fluid even at low temperatures. Slashing may be carried out at 140°F. or near the boil without apparent effect on resin stability. In comparison with starch, no difference could be noted during drying or in passage of the warps through the split rods.

However, in all cases the styrene resin produced a softer hand and what appeared to be a smoother coating on the yarn.

With respect to weaving efficiency, French spun yarns yield good to very good results; in some cases, the overall efficiency is over 90 per cent. However, Bradford type yarns treated similarly to French yarns fail to show anything above poor efficiency.

Due to the small number of trials made, it was not thought advisable to vary the concentration of the resin, consequently, we were unable to learn what could be expected on this score.

On acetate rayon yarns, styrene resins have been used with pronounced success, giving a high over-all loom efficiency. In contrast with more hygroscopic sizing materials, it has been found that the humidity of the weave shed has no apparent effect on weaving efficiency. This is of special interest in view of the low regain of acetate, and it indicates the styrene resins as distinct aids for sizing and weaving the fiber.

Removal of the sodium salt of the resin from acetate yarn has been carried out without any additional finishing process, increase in temperature or other than usual chemicals. No evidence has been found to indicate retention of the resin after finishing.

Comparable mill scale trials of alkyd resins have not been made.

Conclusions

As the work progressed in the development of this paper, many angles came to light which deserved further or more complete study. Due to lack of time, the committee was unable to follow through on all of these points. Some of these ideas warrant further investigation by those interested.

From the work accomplished to date, we are able to draw the following definite conclusions which are briefly stated below:

1. Two new water soluble type resins

have been evaluated, which may be used to replace starch in finishing and warp sizing. As a general rule, in fabric finishing two per cent styrene resin or three per cent alkyd resin produces a hand equivalent to five per cent pearl corn starch.

2. Durable finishes may be produced by combinations of these two materials with thermosetting resins of the urea-formaldehyde and melamine-formaldehyde type. They have the further advantage in these combinations of minimizing loss in strength and abrasion resistance.

3. A quaternary ammonium compound in combination with the styrene resin produced a durable finish in a single bath process. A two bath process is indicated at present to yield a similar result when the alkyd resin is used in conjunction with a quaternary ammonium compound.

4. Both the styrene and alkyd resin types have given some indications of suitability as warp sizings. The styrene type shows particular promise and appears to have an advantage over starch in not being affected by humidity. So many factors are involved that no general statement may be made, but on the basis of mill trials further study is indicated.

Appendix

[Chart I appears on the next two pages following]

Properties of Finishing Materials

A. *STARCH*

Clarke, J. A., Finishing Materials, 2nd ed. (1939) W. R. C. Smith Pub. Co., Atlanta, Ga.

Walton, R. P. Comprehensive Survey of Starch Chemistry (1928).

Furry, M. S., U. S. Dept. Agr. Tech. Bull. No. 674 (1939).

Kerr, R. W., Chemistry and Industry of Starch (1944) Academic Press, New York.

Radley, J. A., Starch and its Derivatives (1940) Van Nostrand, New York.

B. *GUMS*

Knecht and Fothergill, Principles and Practices of Textile Printing Griffin & Co., London (1924).

Lange, Hand Book of Chemistry.

C. *LOCUST BEAN GUM*

Ditmar and Kober: Mell. Tex. p16, 734 (1935).

Hart: Rayon Mell. Tex. p17, 365,447,-495 (1936).

Muench and Braessler: Mell. Tex. p19, 668 (1938).

Chwala, Textilhilfsmittel, Edwards Bros., Ann Arbor.

D. *ALGIN*

The American Encyclopedia.

E. *CASEIN*

Sutermeister, Casein and its Industrial Applications Chemical Catalog Co., New York (1927).

F. *GELATIN*

Alexander, Glue and Gelatin, Chemical Catalog Co., 1923.

G. *POLYVINYL ALCOHOL*

U. S. P. 1,922,923—Production of resists in vat colors.

Brit. P. 345,207—Use for Sizing cotton, rayon, wool.

H. *CHEMISTRY OF SYNTHETIC RESINS*

C. Ellis, Rheinhold Pub. Co., N. Y. (1935).

Soluble Styrene Resin Compound in Comparison with Starch as a Finishing Material for Cotton and Rayon

Procedure

Preparation of resin solution:

The necessary amount of resin in powder form was stirred into the cold water and an equal amount of conc. ammonia was slowly added with stirring. A clear solution was obtained in this manner.

Padding Procedure:

The cloths were padded through the cold solution in a laboratory size Butterworth padder and can dried in the laboratory.

Cloths processed:

A. Cotton poplin 90/78-3.2 oz/yd.^{2}

B. Spun rayon linen type 60/45-5.2 oz/yd.^{2}

The two cloths above mentioned were treated in the white boiled off stage and also dyed with the following colors:

2 per cent Pont. F Blue 4GLN.

5 per cent Ponsol Blue BF Dble.

2 per cent Calcomine Diazo Blue BR.

4 per cent Sulfogene Direct Blue BRCF.

The above colors were chosen from each class of dyestuffs because of their good light fastness and their tendency to change in light fastness in presence of various finishing materials. The color blue was chosen because it was thought that blue more efficiently shows depth and shade changes. The Starch and Styrene were made into two per cent, four per cent and eight per cent solutions and padded on to the various dyed and undyed cloths. The exact amount of resin solids deposited on the cloth was determined by weighing before and after padding and drying. The details of test results and observations follow.

Tensile Strength:

The water soluble Alkyd resin was found to have no effect on the tensile strength of cotton or rayon up to 6.4 per cent by weight. This was also found true of comparative measurements using corn starch as a sizing. The results are shown in Chart II.

Abrasion Resistance:

Tests were made using a Taber Abraser with CS-17 wheels and 500 gram weights. Each figure in Chart III is the average of five tests. The results show that water soluble Styrene resin increases abrasion resistance roughly in proportion to the concentration used, and has approximately the same effectiveness as corn starch.

Stiffness

Stiffness was evaluated by hand and it was found that two per cent styrene gave the same hand and stiffness as five per cent corn starch. Four per cent styrene seemed to be just double the stiffness of two per cent and eight per cent double that of four per cent.

Effect on Whites

Two per cent to three per cent styrene on white cloth gives practically no yellowing. Over three per cent styrene, the yellowing increases until it is very apparent at eight per cent. Blueing will overcome the most severe yellowing that may be caused by this resin.

Light Fastness

There was no change in the light fastness of all of the various colors tested. The tests ranged from 40 hours to 100 hours in the standard Fade-Ometer.

Shade and Depth Change of Colors

Of the various colors dyed and finished with styrene resin none changed in actual cast of shade after finishing. The rayon increased in depth of shade from about 10 per cent to 25 per cent in all cases, but this change in depth of shade of the same dyestuffs was not apparent on the cotton.

Wash Fastness

The styrene finished cloths were subjected to AATCC wash test No. 1 and were found not to stand even one washing. Washfastness was not noticeably increased by curing. It will be noted that subsequent plant trials showed somewhat better washability. When the ammonia solution of styrene resin was combined

CHART 4

PHYSICAL AND CHEMICAL CHARACTERISTICS OF STARCHES AND OTHER FINISHING MATERIALS

	STARCHES	GUMS				OTHER NATURAL PRODUCTS				
	CORN, WHEAT, TAPIOCA, POTATO, RICE, SAGO	GUM ARABIC GUM SENEGAL	KARAYA GUM	LOCUST BEAN GUM	GUM TRAGACANTH	ALGIN	CASEIN	GELATIN	GUAR	ROSIN
COLOR	WHITE	LIGHT TO DARK AMBER	AMBER TO DEEP BROWN	SLIGHTLY CREAMY	WHITE TO AMBER	YELLOWISH	YELLOWISH	WHITE TO BROWN	PALE BROWN	AMBER
ODOR AFTER PROPER APPLICATION	NONE	SLIGHT	NONE	NONE	NONE	NONE	SLIGHTLY SOUR	SLIGHT	SLIGHT	CHARACTERISTIC
SOLUBILITY	SOLUBLE (COLLOIDAL)	SOLUBLE	SOL. IN ALKALI	SOLUBLE	SOLUBLE	SOLUBLE	SOL. IN ALKALI	SOLUBLE	SOLUBLE	SOL. IN ALKALI
EASE OF HANDLING	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
STABILITY OF SOLUTIONS	GOOD	GOOD	GOOD	POOR	GOOD	REQUIRES PRESERVATIVE	REQUIRES PRESERVATIVE	REQUIRES PRESERVATIVE	GOOD	FAIR TO GOOD
VISCOSITY OF SOLUTIONS	HIGH (USED HOT)	MEDIUM (USED HOT)	HIGH (USED HOT)	HIGH (USED HOT)	HIGH (USED HOT)	HIGH	MEDIUM	HIGH	HIGH	MEDIUM
BINDING ACTION	GOOD	GOOD	GOOD	GOOD	GOOD	FAIR	GOOD	GOOD	POOR	GOOD
FILM FORMING PROPERTIES WHEN APPLIED TO FABRICS	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	POOR	POOR
EFFECT ON TENSILE STRENGTH	INCREASES	INCREASES	INCREASES	INCREASES	INCREASES	INCREASES SLIGHTLY	INCREASES	INCREASES	NO EFFECT	INCREASES
ELONGATION	DECREASES	DECREASES	DECREASES	DECREASES	DECREASES	NONE	NONE	NONE	NONE	DECREASES
TEAR STRENGTH	DECREASES	DECREASES	DECREASES	DECREASES	DECREASES	NONE	DECREASES	DECREASES	NONE	DECREASES
ABRASION RESISTANCE	INCREASES	INCREASES	INCREASES	INCREASES	INCREASES	NONE	INCREASES	INCREASES	NONE	DECREASES
MOISTURE REGAIN	SLIGHT	SLIGHT	NO EFFECT	SLIGHT	SLIGHT	—	—	—	—	INCREASES
HAND	STIFFNESS	STIFFNESS	SLIGHT	STIFF	SLIGHTLY STIFF	—	STIFF	STIFF	—	STIFF
DURABILITY	NOT DURABLE	NOT DURABLE	NOT DURABLE	NOT DURABLE	NOT DURABLE	NOT DURABLE	NOT DURABLE (FIXED BY FORMALDEHYDE)	NOT DURABLE (FIXED BY FORMALDEHYDE)	—	SLIGHT DURABILITY
COMPATABILITY WITH STARCH AND OTHER FINISHING AGENTS	GOOD	GOOD	ALKALINE PH	GOOD	GOOD	GOOD	ALKALINE PH	GOOD	LIMITED	ALKALINE PH
FLAMMABILITY	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	DECREASES	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	INCREASES
TOXICITY	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	SKIN IRRITANT
CHLORINE RETENTION	SLIGHT	SLIGHT	SLIGHT	SLIGHT	SLIGHT	NONE	YELLOWS	YELLOWS	NONE	NONE
EFFECT ON LIGHT FASTNESS OF DYESTUFFS	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	—	NONE
EFFECT ON WASH FASTNESS OF DYESTUFFS	SLIGHT INCREASE	NONE	NONE	NONE	NONE	NONE	SLIGHT INCREASE	SLIGHT INCREASE	—	NONE
EFFECT OF AGEING	SLIGHT	SLOW YELLOWING	SLIGHT	SLIGHT	SLIGHT	—	YELLOWS	YELLOWS	—	SLIGHT
EFFECT OF ULTRA VIOLET LIGHT	SLOW BREAKDOWN	SLOW BREAKDOWN	SLOW BREAKDOWN	SLOW BREAKDOWN	SLOW BREAKDOWN	RAPID BREAKDOWN	RAPID BREAKDOWN	RAPID BREAKDOWN	—	SLOW BREAKDOWN
REFERENCES	A	B	B	B, C	B	D	E	F	—	—

CHART I

PHYSICAL AND CHEMICAL CHARACTERISTICS OF VARIOUS SYNTHETIC FINISHING MATERIALS

	CELLULOSE DERIVATIVES CMC, CEGLIN, KOPAN	METHYL CELLULOSE	POLYVINYL ALCOHOL	THERMOSETTING RESINS UREA–FORMALDEHYDE MELAMINE–FORMALDEHYDE	THERMOPLASTIC RESINS ACRYLATES METHACRYLATES STYRENES, VINYLS	WATER SOLUBLE ALKYD RESIN	WATER SOLUBLE STYRENE RESIN
COLOR AFTER APPLICATION	COLORLESS	COLORLESS	COLORLESS	COLORLESS	COLORLESS	SLIGHTLY YELLOW	SLIGHTLY YELLOW
ODOR AFTER PROPER APPLICATION	NONE	NONE	NONE	SLIGHT	SLIGHT	SLIGHT	SLIGHT
SOLUBILITY	SOL. COLD CAUSTIC	SOL. COLD WATER	SOLUBLE (COLLOIDAL)	SOLUBLE	COLLOIDAL DISPERSIONS	SOL. IN ALKALI	SOL. IN ALKALI
EASE OF HANDLING	REQUIRES CARE	REQUIRES CARE	GOOD	REQUIRES CARE	GOOD	GOOD	GOOD
STABILITY OF SOLUTIONS	REQUIRES PRESERVATIVE	REQUIRES PRESERVATIVE	REQUIRES PRESERVATIVE	FAIR TO GOOD	GOOD	GOOD	GOOD
VISCOSITY OF SOLUTIONS	HIGH	HIGH	HIGH	LOW	LOW	MEDIUM	MEDIUM
BINDING ACTION	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
FILM FORMING PROPERTIES WHEN APPLIED TO FABRICS	GOOD	GOOD	GOOD	VARY	VARY, GENERALLY GOOD	GOOD	GOOD
EFFECT ON TENSILE STRENGTH	SLIGHT INCREASE	SLIGHT INCREASE	INCREASE	DECREASE	INCREASE	INCREASES	INCREASES
ELONGATION	SLIGHT INCREASE	NONE	DECREASE	DECREASE	VARY	INCREASES	NO EFFECT
TEAR STRENGTH	SLIGHT INCREASE	NONE	DECREASE	DECREASE	VARY	DECREASES	DECREASES
ABRASION RESISTANCE	SLIGHT INCREASE	SLIGHT INCREASE	INCREASE	DECREASE	INCREASE	INCREASES	INCREASES
MOISTURE REGAIN	NO EFFECT	NO EFFECT	HIGH	DECREASE	SLIGHT	SLIGHT	SLIGHT
HAND	STIFF, FULL	STIFF	STIFF	VARYING DEGREES OF STIFFNESS	WIDE RANGE SOFT TO STIFF	STIFF	STIFF
DURABILITY	DURABLE (REQ. ACID COAGULATION)	NOT DURABLE	NOT DURABLE	DURABLE (REQ. CURE)	VARY, NON-DURABLE TO DURABLE	NOT DURABLE ALONE (SEE TEXT)	NOT DURABLE ALONE (SEE TEXT)
COMPATIBILITY WITH STARCH AND OTHER FINISHING AGENTS	ALKALINE PH	LIMITED	GOOD	GOOD; NEUTRAL OR ALKALINE PH	LIMITED	ALKALINE PH	ALKALINE PH
FLAMMABILITY	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE	SLIGHT INCREASE	GENERALLY INCREASES	SIMILAR TO CELLULOSE	SIMILAR TO CELLULOSE
TOXICITY	NONE	NONE	NONE	SATISFACTORY WHEN PROPERLY PROCESSED	NONE TO SLIGHT	NONE	NONE
CHLORINE RETENTION	SLIGHT	SLIGHT	NONE	HIGH	NONE TO SLIGHT	NONE	NONE
EFFECT ON LIGHT FASTNESS OF DYESTUFFS	NONE	—	—	VARIABLE *	NONE	NONE	NONE **
EFFECT ON WASH FASTNESS OF DYESTUFFS	SLIGHT INCREASE	—	—	GENERALLY * IMPROVE	NONE	NONE	NONE **
EFFECT OF AGEING	SLIGHT	—	—	SLIGHT	VARIABLE	SLIGHT	SLIGHT
EFFECT OF ULTRA VIOLET LIGHT	SLOW BREAKDOWN	—	—	SLOW BREAKDOWN	VARIABLE	PROBABLY SLIGHT	PROBABLY SLIGHT
REFERENCES AND NOTES			9	*ALSO CAUSES SHADE CHANGES ON SOME CLASSES OF COLORS			**DEEPENS SHADES ON RAYONS

CHART II

Effect of Water Soluble Styrene Resin on Tensile Strength

Per cent Resin	COTTON Tensile Strength Warp	Fill	Elongation % Warp	Fill	RAYON Tensile Strength Warp	Fill
none	61	44	0.3	0.3	61	44
1.6	59	50	0.3	0.3	60	41
3.2	62	45	..	..	61	42
6.4	64	47	0.3	0.3	60	40

CHART III

Effect of Water Soluble Styrene Resin on Abrasion Resistance

STARCH MIXES: Corn Starch, Pearl Grade

Cloth	Concentration	Abrasion, Cycles	Increase, %
Cotton	0	350	..
Cotton	1.9	900	157
Cotton	3.5	950	172
Cotton	6.7	1,023	192
Rayon	0	225	..
Rayon	1.9	250	22
Rayon	3.4	317	42
Rayon	6.2	850	278
Water Soluble Styrene Resin Mixes:			
Cotton	0	400	..
Cotton	1.6	525	32
Cotton	3.1	2,752	588
Cotton	6.2	3,000	650
Rayon	0	255	..
Rayon	1.7	351	40
Rayon	3.4	559	119
Rayon	6.7	778	210

with a solution of urea-formaldehyde or melamine-formaldehyde resin plus an accelerator and applied to the fabric and cured, excellent durability to washing with soap and soda was obtained. It was found that eight per cent of urea-formaldehyde resin bound four per cent of styrene resin very effectively.

Effect of Ageing

Samples finished with two per cent, four per cent and eight per cent styrene resin were aged in a ventilated oven at 130°F. for two weeks and no odor or change in shade developed.

Dermatitis

A preliminary animal injection test by a consulting laboratory indicates that this product is not a skin irritant.

Soluble Alkyd Resin Compound in Comparison with Starch as a Finishing Material for Cotton and Rayon

Procedure

The necessary amount of resin in powder form was stirred into cold water and an equal amount of concentrated ammonia was slowly added with stirring. A clear solution was obtained. The cloths were padded through the solution at room temperature in a laboratory padder and can dried in the laboratory.

A cotton print cloth, 80x80 construction, 4.00 yd., and a linen type spun rayon fabric, 60x45 construction, 5.2 oz. per sq. yd., were treated in the white, boiled off stage, as well as after dyeing or printing with the following colors:

Direct Dyed Blue
Printed Vat Blue
Printed Vat Helio
Printed Vat Green
Printed Vat Slate
Printed Diazo Scarlet

Tensile Strength

Measurements on cotton print cloth treated with up to 10 per cent resin are given in Chart IV. There was practically no increase in warp tensile strength, but a 21 per cent increase in filling tensile strength. Maximum elongation in both warp and filling was attained at maximum resin solids applied to the test fabric.

Abrasion Resistance

Abrasion resistance was measured on a Taber Abraser, using CS-10 wheels. A marked increase was found using four per cent resin solids applied to the cloth.

Resin Concentration	Abrasion Resistance	Increase
0	485 cycles	—
4%	920 cycles	90%

Stiffness

Stiffness was evaluated by hand and it was found that three per cent alkyd gave the same hand and stiffness as five per cent corn starch. Four per cent alkyd seemed to be just double the stiffness of two per cent and eight per cent double that of four per cent.

Effect on Whites

Two per cent to three per cent alkyd on white cloth gives practically no yellowing and in any case is very slight. Over three per cent alkyd, the yellowing increases until it is very apparent at eight per cent. Blueing will overcome the most severe yellowing that may be caused by this resin.

Light Fastness

There was no change in the light fastness of all of the various colors tested. The tests ranged from 40 hrs. to 100 hrs. in the standard Fade-Ometer.

Shade and Depth Change of Colors

Of the various colors dyed and finished with alkyd resin none changed in actual cast of shade after finishing.

Wash Fastness

The alkyd finished cloths were subjected to AATCC wash test No. 1 and were found not to stand even one wash-

CHART IV

Effect of Water Soluble Alkyd Resin Compound on Tensile Strength and Elongation (Application on Cotton Print Cloth, 80x80, 4.00 yd.)

	Tensile Strength Warp	Filling	% Increase Warp	Filling	Elongation Warp	Filling	% Increase Warp	Filling
No Resin	46.9	34.8			9.2	11.4		
2% Resin	48.1	38.2	2.6	9.8	13.9	11.9	51.1	4.4
4% Resin	48.6	41.6	3.6	19.8	14.2	13.2	54.3	15.8
6% Resin	46.6	38.8	None	11.5	14.3	13.3	55.4	16.7
10% Resin	49.6	42.3	5.8	21.5	14.5	15.9	57.6	39.5

CHART V

Physical Tests on Plant Trial Runs

Fabric and Treatment	Tensile Strength warp	fill	Elongation warp	fill	Tear Strength warp	fill	Abrasion Resistance Taber CS-10 Wear Cycles
COTTON, 136/60 Broadcloth							
3.5% Pearl Corn Starch	71	43	10%	15%	3.0	2.7	710
2.0% Styrene Resin	75	49	10	13	2.0	2.0	2150
1.7% Styrene Resin plus 7.2% Melamine-Formaldehyde	64	30	8	13	1.5	1.5	940
2.0% Styrene Resin plus 2.0% Quaternary Ammonium	77	40	10	13	1.6	1.6	1180
2.8% Alkyd Resin	76	51	11	14	2.3	2.0	870
2.2% Alkyd Resin plus 7.2% Melamine-Formaldehyde	67	32	8	11	1.5	1.6	1900
SPUN RAYON, Linen Type, 42/40, 40½", 3.75 yd.							
1.7% Styrene Resin plus 7.2% Melamine-Formaldehyde	62	30	8	21	2.5	3.6	140
2.0% Styrene Resin plus 2.0% Quaternary Ammonium	77	40	11	25	3.2	3.7	180

CHART VI

Shrinkage Tests on Plant Trials

CC-T-191a wash tests were made on samples of the plant trials. The white cotton broadcloth was washed at the boil, as specified for cotton. The spun rayon fabric was given the 100 degree, 10 minute wash outlined in the specifications.

Fabric and Finish Applied	*Warp Shrinkage*	*Filling Shrinkage*
COTTON		
3.5% Pearl Corn Starch	5.8%	0.2%
1.7% Styrene Resin plus 7.2% Melamine-Formaldehyde Resin	2.5	0.0
2.0% Styrene Resin plus 2.0 Quaternary Ammonium Compound	6.7	0.6
2.2% Alkyd plus 7.2% Melamine-Formaldehyde Resin	2.3	0.3
SPUN RAYON		
1.7% Styrene Resin plus 7.2% Melamine-Formaldehyde Resin	2.6	0.6
2.0% Styrene Resin plus 2.0% Quaternary Ammonium Compound	11.1	2.5

CHART VII

Resin Permanence Tests on Plant Trials

No. 3 AATCC Wash Test—45 minutes at 160° F. with 0.5% soap and 0.2% soda ash

Fabric	*Finish Applied*		*Loss in Weight on Washing* 1st wash	2nd wash	3rd wash
COTTON	136/60 Broadcloth				
	Pearl Corn Starch	3.5%	0.08%	0.3%	0.6%
	Styrene Resin	2.0	0.04	0.4	0.5
	Styrene Resin	1.7			
	Melamine-Formaldehyde	7.2	0.3	0.7	1.2
	Styrene Resin	2.0			
	Quaternary Ammonium	2.0	0.09	0.3	0.2
	Alkyd Resin	2.8	1.5	2.3	2.4
	Alkyd Resin	2.2			
	Melamine-Formaldehyde	7.2	0.9	1.3	1.6
SPUN RAYON	Linen Type				
	Styrene Resin	1.7	1.4	2.2	3.5
	Melamine Formaldehyde	7.2			
	Styrene Resin	2.0	0.4	1.3	2.1
	Quaternary Ammonium	2.0			
COTTON	Alkyd Resin	2.8	0.9	0.3	0.9
	Quaternary Ammonium	2.0			

CHART VIII

Warp Sizing—Laboratory Trials

Fibre	*Unsized*		*10% Thinboiling Corn Starch*		*Water Soluble Alkyd Type Resin*		*Water Soluble Styrene Type Resin*	
	Breaking Strength	*% Elongat.*	*Breaking Strength*	*% Elongat.*	*Breaking Strength*	*% Elongat.*	*Breaking Strength*	*% Elongat.*
Cotton 36/1	174.3 g.	5.92	216.5	4.95	212.9	6.20	211.1	4.72
Bright Rayon 150-40-3	248.3	13.77	259.6	11.4	245.1	12.0	165.7	14.22
Acetate 150-40-Low Twist	180.8	21.0	168.8	13.75	158.9	16.65	162.0	17.27
Wool French Process	162.0	11.47	210.2	16.82	189.3	25.62	186.5	19.12

Figure on breaking strength in grams and elongation in % are the average of 10 single yarn tests.

ing. When the ammonia solution of alkyd was combined with a solution of urea-formaldehyde or melamine-formaldehyde plus an accelerator and applied to the fabric and cured, excellent durability to washing with soap and soda was obtained. Eight per cent of urea-formaldehyde seemed to bind four per cent of alkyd resin very easily and effectively.

Effect of Ageing

Samples finished with two per cent, four per cent and eight per cent alkyd resin were aged in a ventilated oven at 130°F. for two weeks and no odor or change in shade developed.

Dermatitis

A preliminary animal injection test by a consulting laboratory indicates that this product is not a skin irritant.

Cloth Constructions

White Cotton Broadcloth-Mercerized 37 in.—130x60—3.40 yd.

Blue Cotton Broadcloth-Mercerized 37 in.—130x60—3.40 yd.

Cotton Print Cloth-Mercerized 39 in.—80x80—4.00 yd.

Blue Spun Rayon 40½ in.—42 x 40—3.75 yd.

Plant Formulations and Methods of Application

Finishing Mixes for Cottons:

1. Pearl corn starch—5%

1A. Water soluble styrene resin:
Styrene Resin— 3 lbs.
Ammonia (Conc.)—3 lbs.
Bulk 12 gallons

1B. Water soluble alkyd resin:
Alkyd Resin— 4 lbs.
Ammonia (Conc.)—4 lbs.
Bulk 12 gallons

2. Water soluble styrene plus melamine-formaldehyde:
1A above 11 gallons
Melamine Resin (80%)—15 lbs.
Ammonia type accelerator— 6 oz.
Bulk 14 gallons

2A. Water soluble alkyd plus melamine-formaldehyde:
1B above 11 gallons
Melamine Resin (80%)—15 lbs.
Ammonia type accelerator— 6 oz.
Bulk 14 gallons

3. Water soluble styrene plus quaternary ammonium compound:
A. Styrene Resin 3 lbs.; Ammonia (Conc.) 3 lbs.; Amyl Acetate 3 lbs.
B. Quaternary ammonium compound 3 lbs.
Bulk 12 gallons

Add B to A with stirring. Result is a creamy mix.

3.A. Water soluble alkyd plus quaternary ammonium compound:

2 bath process (Slop pad in each case):

1st. Run—4 lbs. alkyd resin to 12 gallons. Dry on tenter frame.

2nd Run—3 oz. per gallon quaternary ammonium compound. Dry on tenter frame. Cure.

Finishing Mixes for Spun Rayon:

Formulae 2, 2A, 3 and 3A.

Method of Handling:

All trial pieces were slop padded (one dip, one nip) at 80° F., frame dried at 280° F. and cured 2 min. at 300° F. in gas fired cure box. The slop pad pickup was 70% for the cottons and 80% for the spun rayon. The pieces were then given three nips in a 5. bowl cold calender.

UNSIZED YARNS

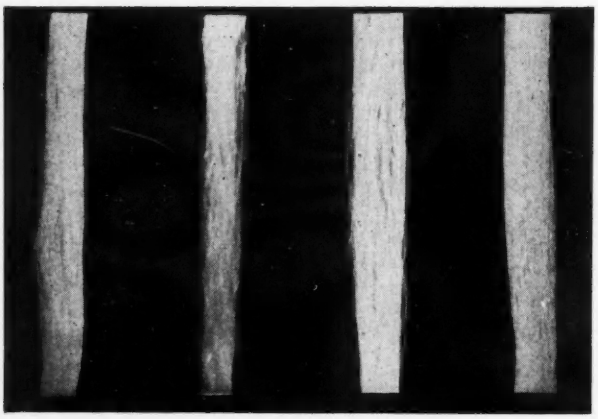
Cotton 36/1 | Rayon 150-40-3 | Acetate 150-40-L. Tw. | Wool French Process

10% THIN BOILING CORN STARCH

Cotton 36/1 | Rayon 150-40-3 | Acetate 150-40-L. Tw. | Wool French Process

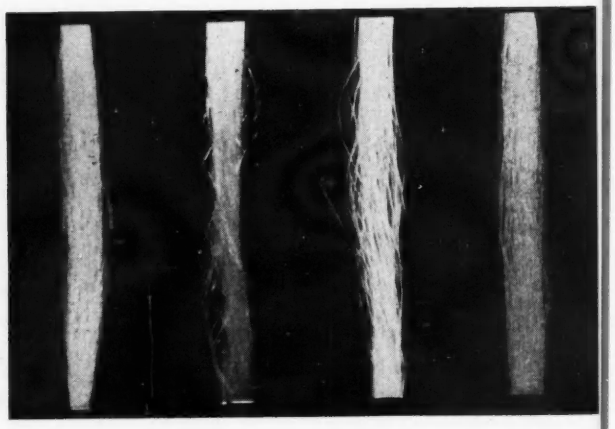
4% ALKYD

Cotton 36/1 | Rayon 150-40-3 | Acetate 150-40-L. Tw. | Wool French Process



4% STYRENE

Cotton 36/1 | Rayon 150-40-3 | Acetate 150-40-L. Tw. | Wool French Process



Sizing of Yarns With Corn Starch, Styrene and Alkyd Type Resins

The laboratory tests were made on a small scale slasher, provided with a steam heated impregnation box, a pair of squeeze rollers consisting of a steel and a rubber covered bowl, a steam heated drying cylinder and a wind-up roll. All sizes were run at a bath temperature of 160-180° F, and the expression was about 100%. The speed of the machine was approximately 12.2 yds. per min.

The following yarns were run:

1. Grey cotton 36/1
2. Rayon (bright) 150-40-3
3. Acetate (dull) 150-40-low twist
4. Wool (French Process) single 1/30

The sizes were made in the following concentrations:

1. Thin boiling corn starch 10%
2. 4% water soluble styrene type resin and 4% of borax
3. 4% water soluble alkyd type resin and 4% ammonia conc.

About 300 yards of each yarn was then run through each size, wound and reeled off into skeins. The tests were made on an Alfred Suter single yarn tensile strength testing machine, and 10 single tests averaged to give one reading (See Chart VIII). The results are expressed as grams of weight to produce the break, and % of elongation from original test length at the time of break.

Mounts of the actual yarns sized were on display at the convention. Photographs of these mounts are shown herewith.

Acknowledgment

We wish to express our appreciation to the following companies for their contribution of the services of their personnel, materials, and equipment:

American Cyanamid Company
Apponaug Company
Cranston Print Works.
Greenville Finishing Company
Hart Products.
Lorraine Manufacturing Company
Mount Hope Finishing Company
Rohm and Haas
Sayles Finishing Plants, Inc.
Stein-Hall
Slatersville Finishing Company
United States Finishing Company.

Winter Meeting, Mid-West Section

THE Winter meeting of the Mid-West Section was held at the Bismark Hotel, Chicago, Illinois, February 22, 1947.

The afternoon meeting was called to order at 3:00 p. m. and 90 members and guests were present. The meeting consisted of an open forum led by our current "panel of experts":

T. Manseau
Dave Anderson
Charles Sillen
George Linberg

Question No. 1.

Eric Hempel asked what would cause sulfur from Texas area used in double bleaching of wool to form sludge and not burn clean?

Answer:

Louis Blank suggested more draft would overcome this condition. Mr. Hultberg stated the crystallization of the sulfur in that area may be different with possible adverse effects.

Question No. 2.

Mr. Bentert asked whether worsted yarn of 64's single or higher grade could be bleached in a package machine?

Answer:

Mr. Smullins stated that Bradford spun yarn could be done satisfactorily if the scour is uniform. It is being done on French spun singles. Some felting takes place due to alkaline treatment. Chlorinated wool is done in skein form.

Mr. Mitchel of Columbiaville Woolen stated that he has been successful with a Franklin Machine by reducing the holes to 1/32 inch to increase pressure. Dry slowly to prevent yellowing.

Louis Blank reported success by scouring with a detergent and ammonia bleach with peroxide. Drying at 150° F. to 160° F. does cause yellowing.

Mr. Mitchel also suggested use of an enzyme plus a detergent for scouring and dry without heat.

At this point J. Bentert gave a short talk on conditions in the textile field in Germany wih regard to advances in knitting machines.

Question No. 3.

Herman Boxser asked how many mills are using resins for shrinkage control of wool?

Answers:

George Linberg of Monsanto stated it is in the development stage, although several mills are experimenting with it at present.

Herman Boxser stated that he has been experimenting in the laboratory two years with resins to control felt, but as yet has not overcome mechanical problems.

Walter Jaeger stated that at present the equipment in hosiery mills is not satisfactory for use of resin to control shrinkage. He further stated that a piece of cloth 60 inches wide and fulled to 55 inches, then drawn out to 58 inches can be set there by use of resin. Mr. Jaeger also brought out the fact that treating wool with resin in the relaxed state produces best results and a softer hand. Mr. Jaeger remarked that returning to Mr. Boxser's original question, he could say that he knew of one mill in the East turning out 75,000 yards of tubular knit (100 per cent wool) goods per week, controlled for shrinkage with resin by a padding process followed by drying and curing.

Clarence Wille asked whether a paddle or rotary machine could be used for applying resin to wool hosiery.

Mr. Jaeger said it could be done although the volume is large and would require high concentration of resin.

At this point Al Feit read a letter from J. Robert Bonnar, chairman of the Executive Committee on Research.

Meeting adjourned at 4:15 p. m.

Dinner was served at 7:30 p. m. and 104 members and guests were present.

A motion was made by Louis Blank and seconded by Ed. Diehl to dispense with the reading of minutes of previous meeting. Carried.

On a motion by S. Klein, seconded by George Linberg, the Treasurer's report was accepted as read.

Al. Feit discussed holding our Annual Outing at Lake Lawn on June 21st.

Arthur Hultberg made a motion, seconded by Kenneth Giese, that the outing be held June 21st at Lake Lawn, Delavan, Wisconsin. After some discussion this motion was carried.

Norman Koehler was appointed Chairman of the Outing Committee.

George Linberg addressed the section on the coming National Convention, relating many pertinent facts to be considered.

Election of officers followed.

S. Klein, Chairman of the Nominating Committee, reported that his committee favored retaining same slate of officers. This was approved by the members present and the following list of officers was retained to serve another term.

Al. J. Feit, Chairman; George E. Osha, Vice-Chairman; Jos. H. Jones, Treasurer; George B. Chabot, Jr., Secretary.

Sectional Committee as follows:

E. J. Seigrist, Herman Boxser, A. G. Alexander, Al. J. Olson.

Councilors for Mid-West Section are: Eric W. Camp, Samuel Klein.

The Nominating Committee was composed of:

S. Klein, Chairman; Louis Hoehn, Eric W. Camp, Herman Boxser, Paul W. Willgeroth.

New Business

The National Convention was discussed and following committees appointed:

Convention Chairman—Elmer Smith.

Finance Committee—J. H. Jones, Chairman; Frank Acker, Al. Olson, Gordon Stott.

Entertainment Committee — Norman Koehler, Chairman; K. A. Coate, Al. Roy.

Publicity Committee—Elliott Morrill, Chairman; Arthur Barker.

Rooms and Transportation—Eric Camp, Chairman; Robert Brenner, Robert Gow III, E. J. Sindt.

Banquet Committee—Arthur Brainerd, Chairman; Louis Hoehn, Tom Latham, Harold Calvert.

Registration and Reception—James Morrison, Chairman; L. B. MacFarland, Gil Latham, Ray Haas, Merrill Morris, Edson Rice.

Technical Program—Herman Boxser, Chairman; Leslie Meyers, J. Kritchevsky.

Printing Committee—George B. Chabot, Jr., Chairman; Walter Jaeger, A. P. Wandtke.

Ladies Committee—Frank Meyer, Chairman.

Committee on Exhibits—Samuel Klein, Chairman.

George Linberg suggested we send literature periodically to each section secretary for distribution as a means of publicizing the convention.

Meeting adjourned at 8:55 p. m.

Respectfully submitted,

GEORGE B. CHABOT, Jr.,
Secretary.

—♦ ♦—

Membership Applications

(Continued from Page P165)

Frank J. Prasil—Vice-Pres. & Supt. of Dyeing, The Almore Dye House, Inc., Chicago, Ill. Sponsors: L. B. McFarland, E. F. Smith.

Earl W. Price—Chemist & Foreman, Celanes Corp. of America, Cumberland, Md. Sponsors: R. L. Hunter, A. T. Normand.

Frank G. Prue—President & Sales Mgr., Woonsocket Color & Chem. Co., Inc., Woonsocket, R. I. Sponsors: R. D. Broadhurst, T. E. O'Rourke.

James M. Redding—Supt. of Dyeing, Wm. D. Sykes & Co., Inc., Philadelphia, Pa. Sponsors: W. Alkus, J. W. Schenkel.

Marjorie W. Sandholzer—Asst. Chemist, Fire Resistance Sect., Nat. Bureau of Standards, Washington, D. C. Sponsors: W. D. Appel, C. M. Hunt.

Harry J. Seibold—Text. Tech., Merchandise Research Labs., Philadelphia, Pa. Sponsors: J. Koch, Jr., P. Theel.

Paul V. Seydel—Partner, Seydel Woolley & Co., Atlanta, Ga. Sponsors: J. C. Cook, J. W. Stallings.

Nabari H. Shah—Head of Bleaching, Dyeing, Printing & Finishing Depts. The Bhalakia Mills Co. Ltd., Ahmedabad, India. Sponsor: S. N. Rao.

Marc V. Shivers—Asst. Dyer, Union Bleachery, Greenville, S. C. Sponsors: C. N. Rabold, L. W. England.

Victor Snowden—Dyer, Providence D. B. & C. Co., Providence, R. I. Sponsors: J. H. Murray, E. A. Wilkinson.

Joe C. Steele—In charge of Dyeing & Finishing, Belmont Hosiery Mills, Inc., Belmont, N. C. Sponsors: F. E. Sprock, H. M. Sprock.

Lester W. Stevens—Owner, High Point Chemical Mfg. Co., High Point, N. C. Sponsor: R. H. Smith.

Timothy Stevens—Foreman Dyer, Slingsby Mfg. Co., Brantford, Ont., Canada. Sponsors: C. B. Musgrave, T. Rostron.

Dane Strong—Dyer, Slingsby Mfg. Co., Brantford, Ont., Canada. Sponsors: C. B. Musgrave, T. Rostron.

John J. Teman—Finisher, Forrest Piece Dye Works, Inc., Easton, Pa. Sponsors: W. O. Neeb, A. Guffy.

Frank G. Thwaites—Salesman, Geigy Co., Inc., Toronto, Canada. Sponsors: W. H. Turner, W. E. Durgin.

Neal A. Truslow—Research Engr., Chicopee Mfg. Co., Masslinn Div., Milltown, N. J. Sponsors: L. S. Thompson, C. Z. Draves.

Louis C. Tolleson—Mechanical Research, Union Bleachery, Greenville, S. C. Sponsors: C. N. Rabold, L. W. England.

Chester L. Torrey—Supt. of Dyeing, Royal Duluth Mills Co., Duluth, Minn. Sponsors: A. T. Brainerd, H. Boxser.

Thomas S. Waller—Chief Chemist, Colonial Mills, Inc., Clarksville Div., Clarksville, Va. Sponsors: L. G. Trimmier, J. A. Hopwood.

Jules Witten—Gen. Mgr. & Purchasing Agt., Gastonia Thread Corp., Gastonia, N. C. Sponsors: W. L. Barker, J. S. Neely.

John H. Wyckoff, Jr.—Salesman, S. T. Dahl Co., Agents, Calco Chemical Co., Los Angeles, Calif. Sponsors: F. P. Brennan, S. Springer.

Herman T. Young—Boss Dyer, Hornell Industries, Inc., Hornell, N. Y. Sponsors: E. D. Altwegg, L. J. Roos.

John E. Young, Jr.—President & Gen. Mgr., Hagerstown Hosiery Co. Inc., Hagerstown, Md. Sponsors: A. E. Koch, H. E. Rollins, Jr.

JUNIOR

William C. De Sieghardt—Control Chemist, Eavenson & Levering Co., Camden, N. J. Sponsors: J. A. Levering, A. Eavenson.

Frank C. Donofrio—Junior Supervisor, Text. Resin Application Lab., American Cyanamid Co., Calco Chem. Div., Bound Brook, N. J. Sponsors: H. A. Wormwood, K. H. Barnard.

Michael Kent—Text. Tech. in Dyeing, Finishing, Manville Fabrics, Inc., New York, N. Y. Sponsors: V. A. Schiffer, J. K. Frederick, Jr.

Lynn Kippax—Salesman, American Aniline & Extract Co., Inc., Philadelphia, Pa. Sponsors: J. E. Goodavage, M. H. Silberman.

Jack Z. McNabb—Supt. & Salesman, O. F. Zurn Quaker City Chem. Co. Div., Knoxville, Tenn. Sponsors: J. D. Mosheim, F. L. Kibler.

Walter R. Melford—Asst. Dyer, Triangle Finishing Corp., Johnstown, N. Y. Sponsors: B. J. Wishnietsky, E. J. Levine.

George H. Momeier—Trainee, Clearwater Mfg. Co., Clearwater, S. C. Sponsors: J. L. Wyman, L. G. Atkins.

Anthony W. Visocki—Asst. Dyer, Triangle Finishing Corp., Johnstown, N. Y. Sponsors: B. P. Wishnietsky, E. J. Levine.

ASSOCIATE

Nicolas Bauer—Sales Agent, Buenos Aires, Argentina.

Pierre J. De Reyer—Manager, Blanchisserie "Monplaisir" Merxem-Anvers, Belgium.

Malcolm M. Eckhardt—Supervisor, Sidney Blumenthal & Co., Inc., Shelton, Conn.

Hugh P. Godard—Research Chemist, Aluminium Laboratories, Ltd., Kingston, Ont., Canada.

Leslie N. Harrison—Dist. Mgr., The Girdler Corp., Charlotte, N. C.

Dorothy F. Regnery—Altadena, Calif.

Daniel J. Reilly—Asst. in Pad Dye Lab., Sidney Blumenthal & Co., Inc., Shelton, Conn.

Lawrence J. Renaud—Plant Mgr., General Textile Mills, Inc., Carbondale, Pa.

Charles B. Vadon—Plant Mgr., Lafayette Dyeing & Finishing, Inc., Paterson, N. J.

Emil F. Werly—Director of Research, W. C. Hardesty Co., Inc., Dover, Ohio.

STUDENT

Paul S. Brogan—Philadelphia Textile Institute. Sponsor: P. Theel.

Albert D. Gusman—Philadelphia Textile Institute. Sponsor: P. Theel.

Charles P. Hoffner—Philadelphia Textile Institute. Sponsor: P. Theel.

Jack W. Jerome—Philadelphia Textile Institute. Sponsor: P. Theel.

Jennings B. Koller, Jr.—Philadelphia Textile Institute. Sponsor: P. Theel.

Paul V. Riley—Catholic University of America. Sponsor: F. O. Rice.

Paul N. Dargie—Bradford Durfee Technical Institute. Sponsor: L. B. Coombs.

Demetrios G. Manolis—Bradford Durfee Technical Institute. Sponsor: L. B. Coombs.

Albert E. Medas—Bradford Durfee Technical Institute. Sponsor: L. B. Coombs.

Thaddeus G. Clayton—Georgia School of Technology. Sponsor: C. A. Jones.

Robert T. Cummings—Georgia School of Technology. Sponsor: C. A. Jones.

EMPLOYMENT REGISTER

(Full details on applicants are available from the Secretary).

47-23

Education: High school and part college.
Experience: 17 years, mainly with one company, application laboratory work on variety of dyes and fibers, including printing and resin bonded pigments, with executive responsibilities.
Age 36; married; references; will go anywhere in U. S.

47-24

Education: High school, and courses in R. I. School of Design.
Experience: Boss dyer, wool raw stock, cotton.
Age 50; widower; references from all employers; will go anywhere in U. S.

47-25

Education: Lowell Textile Institute, graduate, textile chemistry and dyeing, 1932.
Experience: Eight years textile chemist and colorist in print works; inspector for Quartermaster Corps, Army of U. S.
Age 36; married; references; position as chemist or salesman in New England preferred.

TRADE NOTES • NEW PRODUCTS

OBITUARY

ALFRED F. LICHTENSTEIN

ALFRED F. LICHTENSTEIN, chairman of the board of Ciba Company, died on February 24th. He was 70 years of age.

Mr. Lichtenstein was born August 6, 1876. Upon completing his schooling at Brooklyn Polytechnic Institute, and graduate work in Germany, he entered the Passaic Print Works as a chemist in 1898. In 1899 he went with the Arnold Print Works in North Adams, Mass., as an assistant chemist. He remained there for five years and on February 1, 1905 joined the dyestuff firm of Geisenheimer & Company, representing K. Oehler of Offenbach, Germany. In 1908 he became a junior partner and in 1917 took over the firm and formed his own concern: Aniline Dyes & Chemicals, Inc. In 1921, Ciba Limited, Basle, Switzerland, then known as the Society of Chemical Industry in Basle, bought Aniline Dyes & Chemicals, Inc. Mr. Lichtenstein was President of Ciba Company, Inc., New York, until February 1, 1946 when he retired from active management and was elected Chairman of the Board.

Mr. Lichtenstein's long years of intimate contact with the dyestuff industry in its formative years made his advice much sought after. His circle of friends was very large in the industry.

Mr. Lichtenstein is survived by his wife and daughter.

* * * *

Mr. Lichtenstein was internationally famous as a philatelist. According to *Stamps*, he first came into international prominence about 1911, when he purchased the famous collection of George H. Worthington of Cleveland, which at that time was one of the largest and best known in existence. His collection continued to grow year after year. His main specialties were in British North America, Switzerland, Cape of Good Hope, Mauritius, Uruguay, Argentina, and United States Western Franks.

He served as Chairman of the International Philatelic Exhibitions in 1926 and 1936 and was the chairman of the Jury at each of these affairs. In 1926 he won the Grand Trophy which he since donated for the Grand Award for the 1947 Centenary International Exhibition. He also acted as chairman and a member of juries for stamp shows throughout the world. He was a Fellow of the Royal Philatelic Society of London and had been acting as their representative in America for many years. His name was on the Roll of Distinguished Philatelists, and he had received almost every other honor that philately has to offer.

In April, 1945, he was elected Chairman of the Philatelic Foundation, Inc., chartered under the State Board of Regents of the University of the State of New York. It was under his supervision that the Foundation organized an Expert Committee, of which he was also the Chairman. Last Fall, he made a trip to Europe and while there he selected portions of the collection of King George VI for exhibition at the Centenary Show.

Alfred F. Lichtenstein

JOHN URL

JOHN URL, President of Heading, Inc., textile printers in Long Island City, New York, died recently at Memorial Hospital, Morristown, New Jersey. He was 65 years old.

GREGOR MEIER

GREGOR MEIER, secretary and one of the founders of the Cliffside Dyeing Company of Paterson, N. J., died on March 11th at his home in Hawthorne, N. J. He was 71 years old.

Born in Vienna, Mr. Meier helped found the Cliffside company in 1940. Previously Mr. Meier has been with the Wiedmann Dyeing Company, Amalgamated Silk Corp. and the Sunbury Converting Works.

• Lowell Textile Institute Alumni Reunion

The keynote of the Lowell Textile Institute Alumni Reunion this year will be the celebration of the fiftieth anniversary of the school, founded in 1897.

April 25 and April 26 have been selected for the gathering of the alumni, with the first day in Boston and the second at the Institute in Lowell, where appropriate ceremonies will mark the golden jubilee of the Textile Institute.

The April 25th program will get under way at the Hotel Statler in Boston at 6 p. m. with registration and a banquet. Commissioner of Education of Massachusetts, John J. Desmond will give the principal address and there will be special greetings from the graduating class of 1900. An entertainment will follow the banquet.

Saturday, April 26th, there will be an address by President Emeritus Charles H. Eames, who guided the Institute for nearly 40 years before his retirement in 1945. An oil painting of the President Emeritus will be unveiled in Southwick Hall with appropriate ceremonies.

Following a business meeting of the Alumni, a buffet luncheon will be served from 12:30 to 1:30 p. m. President Kenneth R. Fox will deliver the main address following the luncheon.

Various group meetings will be held in the afternoon, including a tea for Coeds, and festivities will conclude with

a baseball game between L. T. I. and American International Institute at 3 p.m.

The Alumni Committee in charge of the program includes: Harold V. Farnsworth '16, Chairman; James A. Irvine '17, Co-Chairman; Charles W. Churchill '32, Hotel Reservations and transportation; Edward B. Bell '22, Dinner; Joseph E. Hardman '32, Athletics; Ralph G. Hillman '22, Entertainment; Vernon W. Colby '40, Veterans; William J. Stein '35, New York Chapter Representative; Wallace C. Butterfield, Reunion Treasurer; Rita Landry '46, Registration: Helen M. O'Laughlin '44, Coeds; and Professor Charles F. Edlund, Publicity.

The Charles H. Eames Portrait Committee includes: Edward A. Bigelow '06, Chairman; Arnold J. Midwood '05; Harold V. Farnsworth '16; and J. Milton Washburn, Jr. '21.

• Calco Plant at Willow Island

Vast plant construction program of the Calco Chemical Division, American Cyanamid Company, is rapidly taking shape at Willow Island, West Virginia, seventeen miles north of Parkersburg, West Virginia, on the Ohio River. The company states that production of pharmaceuticals, melamine and inorganic pigments will be centered at the new Willow Island Works.

Construction of the first manufacturing unit is being pushed to early completion to provide for volume production of Folic Acid, the new synthetic vitamin. Production of melamine, a plastic molding material pioneered by the American Cyanamid Company, is expected to begin later this year. Melamine is said to be an important versatile product with numerous industrial uses such as the manufacture of plastic tableware, buttons, automotive fixtures, telephone sets and textile resins for wool shrinkage control.

Construction of other plant units for the production of inorganic pigments has been advanced to meet the unprecedented demand for pigments by the paint and printing ink industries.

A view of the new plant is shown in the above photograph.

• Summer Textile Testing Course

The United States Testing Company, Inc., announces plans to conduct the tenth annual Refresher Course in Textiles and Testing Techniques, at the main laboratories of the Company in Hoboken, New Jersey.

Through lectures, demonstrations and practice sessions, students will cover all phases of analyses on textiles and related merchandise as conducted by a commercial laboratory. The work of the five major divisions of the Company, namely, physical testing, microscopy, chemistry, bacteriology and engineering, will be represented in the three week's study. Specific instructions in the origin, identification and composition of natural and man-made fibers; the testing of woven and knit fabrics for tensile strength, seam slippage, shrinkage and color fastness properties will be included. Special emphasis will be given to the various processes of textile finishing and dyeing. The use of recently developed equipment for determining the Flammability, Coolnss, Warmth, Snag Resistance, Abrasion, Fatigue and friction properties will be reviewed. Sample swatches of fabrics, yarns and fibers, mimeographed text and other illustrative material will be distributed. Field trips to nearby industrial plants, including plants producing synthetic fibers, and a textile finishing mill will be conducted for those interested.

This year, as in the past, classes will be held under the direction of James Giblin, Head of the Textile Design Department at the New Bedford Textile Institute, and will have the personal instruction of the Testing Company's staff technicians. Classes will be in session from 9:00 A.M. to 4:00 P.M. from July 7th through July 25th. A nominal fee will be charged to cover the cost of supplies, mimeographed text and samples necessary for the laboratory work. The group is limited in number so that each member may have the advantage of individual instruction and the opportunity to use much of the equipment.

Applications may be obtained from Rosemary Murphy, Consumer Service Division, United States Testing Company, Inc., Hoboken, New Jersey.

• Carbide and Carbon Chemicals Booklet

"'Cellosolve' and 'Carbitol' Solvents," a new booklet published by Carbide and Carbon Chemicals Corporation, a Unit of Union Carbide and Carbon Corporation, presents in detail the important properties, specifications, uses, and constant boiling mixtures of nine glycol-ethers. In chart form it gives such information as physical constants, comparative evaporation rates, and various solubilities. It also gives 52 references to the glycol-ethers in the technical literature.

Glycol ethers resemble ethanol in solvent properties and are said to be excellent solvents for dyestuffs, used in wood stains, and for the printing and dyeing of textiles. Being neutral solvents, they are also widely used for coupling immiscible liquids in the preparation of soluble oils, insecticides, dry-cleaning soaps, and leather compounds.

A copy of this booklet, Form 4765, may be obtained from the nearest office of Carbide and Carbon Chemicals Corporation.

• New Dexter Booklet

An addition to the Dexter Chemical Library—a series of reprints of articles dealing with various phases of the textile processing industry—is now available to those interested. This latest booklet is entitled, "The Quantitative Analysis of Cotton-Viscose Rayon Mixtures." It is the work of Frank P. Greenspan and Sidney M. Edelstein, the latter being Technical Director for the Textile Chemical Division of the Dexter Chemical Cor-

• Promoted by Mathieson

O. J. Theobald, Jr., who has been promoted by the Mathieson Alkali Works, chemical manufacturing company, to the position of District Sales Manager for the Charlotte, N. C., area, according to an announcement by D. W. Drummond, Vice President-General Manager of Sales. Mr. Theobald will supervise company sales activities in Virginia, North and South Carolina, and parts of Tennessee and West Virginia.

A member of the Mathieson organization since 1932, Mr. Theobald served in various capacities in the company's Chicago, St. Louis and Cincinnati offices prior to his appointment as Assistant District Sales Manager in the Charlotte office last year. He was born in Peru, Indiana and attended Culver Military Academy and Purdue University where he received his B.S. degree in Chemical Engineering. He is a member of a number of associations including the American Chemical Society and the American Water Works Association.

poration of New York City. This article is reprinted from the AMERICAN DYESTUFF REPORTER. Copies of this reprint may be obtained by writing to Publications Digest, 130 West 42nd St., New York, N. Y. Copies of the reprints previously issued may be obtained from the same source as long as the supply lasts. These reprints include, "Lustre Determination with a Photoelectric Photometer", "Variations in the Removal of Pectic Substances from Cotton Yarn in the Mercerization Process", "Mercerization and Dypenol", "A Study of the Mercerization Process", "New Developments in Permanent Cellulose Finishes", "Methods for the Study and Control of Mercerization", and "A Test for Mercerization in the Presence of Dyes" together with "The Effect of Aniline Black on Barium Activity Determination".

• "Vulcanized" Starch

A "vulcanized" starch, resistant to the swelling action of heat and chemicals, and said to possess countless potential applications in industrial fields, has been announced by the research department of National Starch Products, Inc.

As Vulca starches are available with various degrees of non-swelling and non-gelatinizing characteristics, these properties make them suitable for a variety of industrial purposes.

Wide-spread use of these partially treated starches is suggested by a number of possible applications, for example, as printing thickeners in textile operations.

National has applied for patents covering the new line of products, development of which began during the war.

The completely vulcanized starch, known as Vulca-100, is said to answer industrial requirements for an inert, non-toxic organic filler or ingredient. It can be cooked in boiling water or a five per cent alkaline solution without increasing its average granule size more than five microns. Approximately neutral in water suspension, the starch settles after cooking, because the granules are not appreciably swollen or ruptured.

It is stated that the product is non-toxic and is not rapidly hydrolized by acids or enzymes. Steam sterilization makes no essential change in any of the properties of Vulca-100, according to National's development and testing laboratory.

Research samples of the Vulca starches can be obtained from National at 270 Madison Avenue, New York 16, N. Y.

• Joins S. C. Johnson

Robert N. DuPuis, former Assistant Director, Miner Laboratories, Chicago, has joined S. C. Johnson & Son, Inc. as Assistant Research and Development Director, according to Dr. J. Vernon Steinle, Director of the Division. Mr. DuPuis will be in charge of research, development, and experimental engineering operations for the company.

In 1931 Mr. DuPuis received an A.B. degree from the University of Illinois and three years later a Ph.D. from New York University. He is a member of the Board of Directors of the Chicago Section of the American Chemical Society, Council of the American Chemical Society, and member of the Chicago Chemists Club Board of Trustees.

• New Calco Bulletin

The paper, "The Dyeometer: An Instrument for Studying Color Reactions,"

• Discuss Definized Process

Edward Whitford of Traford Fabrics discusses the Definized process of rayon shrinkage control with Commentator Dorothy Day on a recent "Today With Day" broadcast over station WINS, New York. The Definized process, distributed by Aqua-Sec Corporation of New York, is used by Traford on a number of their fabrics which are used by menswear manufacturers.

by Kienle, Royer and McCleary, which appeared in the December issue of the *Textile Research Journal*, has been reprinted as Calco Technical Bulletin No. 792, for immediate distribution.

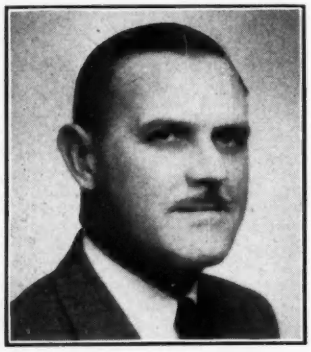
The Dyeometer, a laboratory instrument developed in the Calco Research Laboratories, was exhibited at the AATCC Convention, at the Hotel Statler, in December. This instrument makes possible the study of the dye liquor throughout the dyeing period. With the automatic recording spectrophotometer any changes taking place in a particular portion of the spectrum can be determined. The Dyeometer now in use in the Calco Sales Application Laboratories makes possible rigid control of variations of temperature, volume and circulation of the dyebath, the motion of the material being dyed and the surrounding atmosphere.

Copies of Calco Technical Bulletin No. 792 may be obtained upon request from your Calco Sales Representative or by writing the Advertising Department, Calco Chemical Division, American Cyanamid Company, Bound Brook, N. J.

• Joins Apex Chemical

H. Rothstein, President of Apex Chemical Co., Inc., New York City, announces the addition of Dr. Henry H. Gilmann to the company's research staff at its plant in Elizabeth, N. J.

• Vice-President, American Dyewood



Bert R. Niece, who was elected a vice-president of the American Dyewood Company at the annual meeting of the company held on February 19th.

Mr. Niece has had over thirty years qualifying experience, getting his start with Heller & Merz Company prior to joining the U. S. Army at the outbreak of World War I. He joined the organization of the New York Color and Chemical Company, Division of the American Dyewood Company, Belleville, New Jersey, in 1932, and has been a director of the American Dyewood Company since 1940.

Formerly connected with City Chemical Co., Glyco Products Corp., and Quaker Chemical Products Corp. as research and development chemist, Dr. Gillman is also well known as a consultant to the textile industry in problems of dyeing, finishing and application of resins.

• Textile Resin Finishing Booklet

"Twenty Five Years of Textile Resin Finishing," a review of progress in textile resin finishes over the last twenty-five years, has been published by American Cyanamid Company's Textile Resin Department.

The bulletin concisely reviews the history of resin finishes, briefly describes the basic applications that have been made in the past, present development, and future probable types and uses for textile resins. Included also is a bibliography for the use of those wishing to continue their reading beyond the bulletin.

"Twenty Five Years of Textile Resin Finishing," known as Textile Finishing Bulletin No. 116, is available upon request to the Textile Resin Department, American Cyanamid Company, Bound Brook, N. J.

• New Process for Nylon Raw Material

Development of a chemical process to use such agricultural by-products as corncobs, cottonseed hulls, and the hulls or bran of oats and rice in the making of nylon was disclosed recently by E. I. du Pont de Nemours & Company at the meeting of the National Farm Chemurgic Council held in Oklahoma City on March 27th.

The cobs, hulls, and other cellulosic materials are the sources of a chemical known as furfural. The new process turns furfural into adiponitrile, a chemical important in making nylon. A new unit will be bult at the Du Pont Electrochemicals Department's plant at Niagara Falls to produce the chemical.

Discussing the new process publicly for the first time, Dr. Oliver W. Cass, who headed a research team that worked on the project at the Niagara Falls laboratories, said the development, from the first small-scale laboratory experiments to the large semi-works units which can produce tons of adiponitrile from furfural, cost Du Pont about 12 year's time and approximately $1,000,000.

The Chemurgic Council was told that Du Pont had contracted with The Quaker Oats Company to begin supplying furfural as soon as the Niagara Falls unit beings operations. The Quaker Oats Company estimates it will require 200,000,000 pounds of corncobs, oat hulls, or similar agricultural by-products annually to make the maximum amount of furfural the Du Pont Company might need.

Constant technical improvement of the present nylon processes has made it possible to reduce the price of nylon several times in the past seven years. One typical hosiery yarn, which was sold for $4.27 a pound in January, 1940, is now priced at $2.55.

However, it was emphasized that the use of agricultural by-products, as a starting material, would not necessarily bring a reduction of manufacturing costs in the near future. It was pointed out that this new process makes it possible to use a replaceable source for one of the basic chemicals needed for nylon. Coal and petroleum are irreplaceable resources.

Furfural has been used in chemical processes for 25 years, but it is little known to the layman. It is a tan-colored liquid with a faint bitter-almond odor. A rare chemical 30 years ago, it is now used in refining petroleum lubricants, butadiene for synthetic rubber, wood rosin, and vegetable oils.

Furfural is manufactured largely from corncobs today. On thousands of farms, the cobs are mainly a nuisance after the shelled corn is shipped. They are a fire hazard in the barnyard and a detriment to the soil. While a few are used for fuel in farming communities, they burn very quickly and, compared to the total quantity of cobs produced annually, the amount used as fuel is infinitesimal.

In making furfural, the hulls or cobs are pressure-cooked with a weak acid. Then follows a complicated purification process. Next, there is a most exacting and complicated processing which includes reactions of furfural with steam, gases, and various other chemicals. The result is adiponitrile. This is further processed into hexamethylene diamine in another Du Pont plant at Belle, W. Va., and then reacted wth adipic acid to produce nylon "salt," which looks much like table salt.

To facilitate its handling, this "salt"—chemists call it hexamethylene diammonium adipate—is dissolved in water and transported by tank car to the nylon flake and yarn plants at Seaford, Del., and Martinsville, Va. There the "salt" is further processed and spun into yarn, and flake for molding and extrusion in the plastics industry.

• Vice-President of Aqua-Sec

Henry Sentlar, whose appointment as vice-president and member of the board of directors of the Aqua-Sec Corporation has been announced by William H. Scott, President. Mr. Sentlar has been with Aqua-Sec for ten years and has long been active in the textile field.

Mr. Scott further stated that all other board members and officers of the corporation will remain the same.

• To Speak at Textile Seminar

The importance of textile education to the expansion plans of the American textile industry will be discussed by William D. Fales, head of the Rhode Island School of Design, before the National Textile

Seminar, at Shawnee-on-Delaware, May 15th.

Mr. Fales was in charge of a War Department mission which visited Germany recently to make a study of textile education in that country. He is a past president of the National Association of Textile Deans. Prior to her defeat in World War II, Germany was a leader in the field of textile education.

The National Textile Seminar is sponsored annually by the Philadelphia Textile Institute, Broad and Pine Streets, Dean Richard S. Cox is chairman. It is attended by invitation only, by approximately 200 of the textile leaders of the country, including top administrators and technologists.

The Philadelphia Textile Institute Foundation, a non-profit corporation formed to raise and administer funds for the Institute, recently acquired a 12½ acre tract in Germantown, at Schoolhouse Lane and Henry Avenue, where it is planned to erect a new school with facilities and equipment for a greatly enlarged student body.

The Foundation's forthcoming appeal for financial support from civic interests will be headed by Edward H. Rakestraw.

• General Releases

General Dyestuff Corp., 435 Hudson Street, New York 14, N. Y., has announced release of circulars describing the following products:

Algosol Olive Green IB-CF*—the water-soluble leuco-ester of the vat dye Indanthrene Olive Green B. When applied either in dyeing or printing it is said to produce shades and fastness properties corresponding to those of the vat dye. It is said to possess excellent fastness to light, washing and chlorine. It is stated that, because of its fastness properties, it is much in demand for the printing of cotton, rayon and other vegetable fibers whenever best obtainable fastness is required as for instance for drapery, upholstery and other printed fabrics much exposed to light. It is further said to be a valuable product for the dyeing of cotton, rayon and other vegetable fibers as well as mixtures of these fibers in straight and in combination shades. Mixed fabrics containing cotton or rayon and wool can be padded to obtain solid shades or dyed in an acid bath to leave the vegetable fiber undyed. Circular G-453.

Fast Blue Salt BN—the stabilized diazo compound of dianisidine (Fast Blue B Base.) Its use greatly simplifies and facilitates the preparation of the developing liquor in the application of Naphtols. It is intended primarily for the production of navy blue shades, principally with Naphtol AS and Naphtol AS-SW, which are said to possess very good fastness to washing, good fastness to hot pressing and to light and moderate fastness to chlorine. Because of its good solubility it is applicable in most types of dyeing equipment. Combinations of Naphtol AS with Fast Blue Salt BN yield a white discharge provided anthraquinone is used in the discharge paste. When printed on Naphtol AS prepare, it yields a bright navy blue. Solutions as well as print pastes are said to possess good stability. Circular G-456

Diamine Brown 3GN Conc. CF—a homogeneous direct dyestuff which produces bright yellowish brown shades on rayon, cotton and other vegetable fibers as well as on mixed fabrics. It is said to possess good solubility, to level well and exhaust well on cotton and rayon at temperatures between 180° F. and the boil. On mixed fabrics containing cotton or rayon and wool, the animal fiber is dyed redder and more heavily than the vegetable fiber when dyeing is carried out at or near the boil. At about 180° F. a fairly uniform shade is obtained. In fastness properties the product is not distinguished from most direct colors. It is sufficiently free from copper and manganese to be suitable for rubberizing. Circular G-468.

Supranol Brilliant Red BA-CF*—a homogeneous acid dyestuff which, owing to its brilliant shade and good fastness properties, is said to represent a valuable addition to the line of Supranol Colors. It is said to possess good solubility, to level sufficiently well provided the dyeing directions are followed, and to be useful as a self-shade as well as in combination with other similar dyestuffs for the dyeing of loose wool, tops, yarns and piece goods. It is stated that, due to its good affinity from a neutral bath, it is a very desirable product for the dyeing of union materials. It has good affinity for pure and weighted silk. Circular G-469.

*Indanthrene Brilliant Orange RKA Paste for Printing***—the printing standardization of the familiar dyeing type prepared in the form of a smooth, non-settling, grit free paste. When made up and applied in the usual manner it mixes well, producing bright orange shades. It is suitable for printing on cotton and rayon and, it is claimed, by virtue of its exceptional light fastness in light and dark shades is admirably suited for use in drapery patterns, particularly for the production of pale salmon and rose shades in conjunction with other high light fast types. It is stated that the value of this product is further enhanced by very good fastness to chlorine and washing. Circular G-471.

*Registered, U. S. Pat. Off.
**Patented.

• Dyeing Nylon with Logwood

American Dyewood Company, 22 East 40th Street, New York 16, N. Y. has recently published a booklet entitled: "Nylon Dyed Black with Logwood." Following a discussion of the use of logwood in dyeing nylon the remaining contents of the booklet are described by the following titles: "Method for Dyeing Nylon with Unoxidized Logwood Crystals and Bichromate, Formula No. 1"; "Method for Dyeing Nylon with Oxidized Logwood or Hematine Crystals and Bichromate, Formula No. II"; "Wool-Nylon Mixtures"; and "Cotton-Nylon Mixtures."

• Joins Bernard Color

Irwin Wolder has joined Bernard Color & Chemical Corp., 333 Hudson Street, New York 13, N. Y., as director of their New York Application Laboratories.

Mr. Wolder received his chemical education at the City College of New York and was associated with National Aniline for 16 years, during the latter part of which he was in charge of the textile printing department of their New York sales laboratory. Mr. Wolder left National to organize a laboratory for the application of resin bonded pigments for the Textile Division of F. H. Levey & Company.

• New Textile Detergent

Arnold, Hoffman & Co., Inc., Providence, R. I., announces Ahcovon T, a new detergent recommended for general textile use in scouring, dyeing and finishing. It is said to be efficient in hard water, acid and alkali.

Ahcovon T is a sulfonated petroleum derivative, claimed to possess superior stability to lime and salts than soap. It is light buff in color, in dry flake form, and relatively non-hygroscopic. A 1 per cent solution has a pH of 7.3 — 7.8. It is now ready for delivery in fiber drums of 200-225 pounds.

Knitting Arts Exhibition Number will appear April 21, 1947

• PATENT DIGEST •

Setting Wool A, 2, 04

U. S. Pat. 2,410,248
(Perm, Ltd., Speakman, Oct. 29, 1946)

The patent relates to wool treatments for giving them a permanent set. Wool (and other fibrous products of animal origin) are generally subjected to steaming or hot water treatment. The present invention is connected wih the same inventor's prior patents 2,351,718 and 2,201,929. In these patents it has been proposed to treat wool or hair with a *boiling bisulfite* solution whereby consequently the disulfide bonds (—S—S—) are disrupted and new products are formed. The equations, corresponding to the reaction are here (1) R-S-S-R (representing the wool molecule) + $NaHSO_3$ = R-S-Na + R-S-SO_3H and (2) RSO_3H + R'NH (another peptide = R-S-SO_3-NH_2-R' → (splitting off H_2SO_4) → R-S-NH-R'. Now it has been discovered that setting of the fibers can be carried out at lower temperatures since the treatment at the boiling point may cause serious attacks on the fiber substance. The conditions developed in the new patent are: a pH-value of about —6 and a temperature of 50-70° C. Relatively small concentrations of bisulfite (half molar solutions) are required.

Reference: U. S. Pat. 2,400,377 (same company and inventor) describes a combined treatment with bisulfite and ethanol.

Textile Printing Equipment D, 3

U. S. Pat. 2,410,415
(Cranston Print Works Company, A. S. Jones, November 5, 1946)

The Can. Pat. 347,322 (Dewey and Almy), protected a printing method wherein back gray cloths are omitted. The present invention also aims to work with rubber blankets only which have to be washed and dried after printing before being led again into the roller printing machine. The inventor states that subsequent washing, wringing and drying operations of a rubber blanket require a relatively long run. Moreover the drying apparatus for these rubber blankets is expensive in installation and use. Finally it is not advisable to expose the rubber material to a steam heated surface of a drying drum. It is the purpose of the present invention to provide a simplified washing and drying, fast working mechanism for an endless blanket. The principal feature of this invention consists thereof that the soiled blanket

PAUL WENGRAF

is carried to a washing device, (see Fig. 2) and comprising spray nozzles (28) and (29) and a rotating brush (30). Thereupon the blanket is led between squeezing rolls (36) to a reel where it contacts another web (40) — generally termed as a "blotter." The material of this blotter can be an endless paper band thrown away after the operation but preferably it will consist of a woven cloth which is subsequently dried by passing drums (41) or by radiant heat or the like. Thereby it will be realized that the rubber blanket may be relatively short and that undue damage to the expensive material is prevented.

Crepe Fabric, Improving Dyeing Properties F, 4, 01

U. S. Pat. 2,410,867
(Celanese Corp. of Amer., Croft-Cramer, Nov 12, 1946)

Textile fabrics, exhibiting crepe effects are generally obtained by employing in their construction highly twisted yarns (crepe yarns or crepe threads). In the manufacture of crepe fabrics, composed from natural silk, the twisting operation is relatively simple; it is carried out in the gummed state while the crepe effect appears after degumming. This method however is not suitable for cellulose acetate crepes. The usual procedure consists here of subjecting the yarns to a hot water treatment or a steam reatment during the twisting operation and to subject the woven fabrics to another hot aqueous bath. Certain scouring agents can be added to the hot aqueous baths, which are also called "creping liquids." Uneven dyeings result, particularly when the fabrics have been exposed to air in storage. It has been discovered that this drawback can be minimized by substituting the known scouring-or boiling-off-agents (soap, pine oil, tetralin), generally contained in the creping liquid by small quantities of lower aliphatic acids (example: 1-5 per cent by vol. of glacial acetic acid). A fabric dyed a navy shade for instance, was found to be entirely free of unevenly dyed areas.

References: Celanese Corp. of Amer. obtained already some years ago some patents, dealing with the cellulose acetate crepe problem. Many methods have been developed for treating mixed acetate-rayon crepes. U. S. Pat. 2,070,583 suggests to subject these mixed fabrics to a treatment with swelling agents such as methylene chloride or acetate-ethylester or with emulsions of benzylalcohol (U. S. Pat. 1,995,296). U. S. Pat. 1,985,243

Textile Printing Equipment—

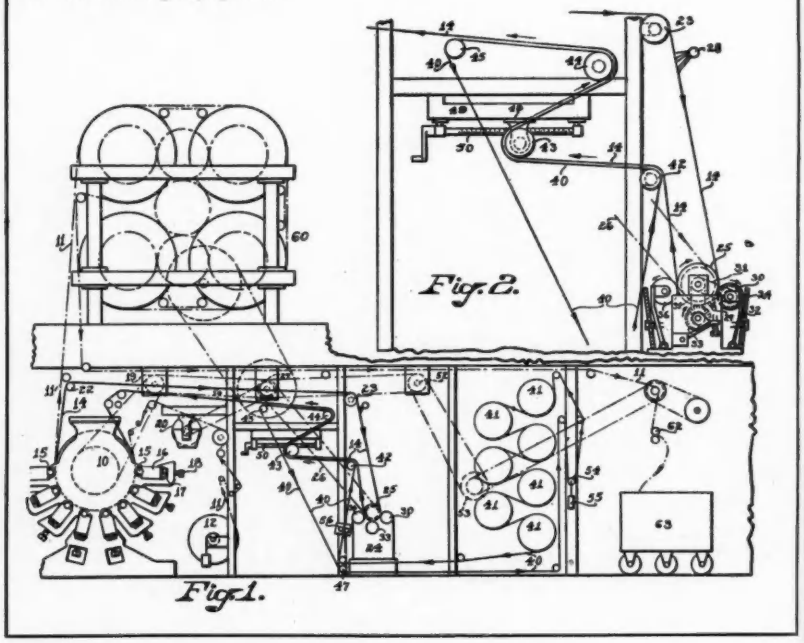


Fig. 2.

Fig. 1.

relates also to mixed fabrics which are aftertreated with nitric acid 38° Tw. whereby the acetate filament shrinks while the non esterified cellulose yarns (rayon or cotton) are not chemically changed in this (short) treatment.

CROSS REFERENCE: Dyeing of Acetate Crepe C, 4, 07

U. S. Pat. 2,410,867
(Celanese Corp. of Amer., Croft-Cramer, Nov. 12, 1946)

See Crepe Fabric, Improving Dyeing Properties F, 4, 01

Dyeing Nylon, Gallocyanines C, 4, 07

U. S. Pat. 2,411,249
(Durand & Huguenin, G. de Niederhaeusern, Nov. 19, 1946)

The AMERICAN DYESTUFF REPORTER (1939, p. 582-590) offered a survey of dyeing methods of nylon and discussed the different dyestuff classes used herein. The inventor states that the *group of gallocyanines* has *not been mentioned* in this survey. It has been discovered that nylon fibers can well be dyed with gallocyanines, particularly with those dyes which contain a sulfo-group. The gallocyanines are generally fixed on a metallic mordant. Here the dyestuff is applied to the fiber in form of its leucoderivative and developed in an oxydizing acid chromate solutions. Water soluble gallocyanine dyestuffs may be applied to the nylon fibers in a non leuconic form from a neutral or slightly acid bath and developed in the same way by oxydizing. An example reports the following dyeing procedure for nylon fibers: the gallocyanine dyestuff, obtained from nitrosodimethylaniline and gallic acid is pasted with NaOH 36° Be and this solution is added to an hydrosulfite containing dyebath. Nylon yarn is entered at 40° C; the temperature is raised to 90° C within half an hour and maintained at this temperature for ¾ hours. After thoroughly rinsing the yarns are oxidized by a treatment with 0.5 g potassium bichromate and 0.2 g formic acid in one liter.

References: AMERICAN DYESTUFF REPORTER, Jan. 28, 1946, Saville, and *Journal of the Society of Dyers and Colourists,* March, 1946, p. 65 and 77, Boulton, published general surveys concerning dyeing operations on nylon fibers. They mentioned the behavior of this material to direct, vat, acid and acetate dyes. This investigation did not comprise the dyeing method with gallocyanines which have not been proposed up to now for nylon dyeing. The Durand & Huguenin Company suggested in Ger. Pat. 526,193 to use leuco-compounds of gallocyanines for dyeing (and printing) acetate of cellulose and other fibers—nylon was not invented at this time—and to re-oxidize the dyestuff by an oxydizing treatment.

Sizing Nylon Yarns, Resin Compounds A, 4, 01

U. S. Pat. 2,411,322
(du Pont, Hardy-Haefele, Nov. 19, 1946)

In the usual sizing devices for yarns (slashers) several ends of yarns are led together through a sizing bath, then through squeeze rolls, around drying cans to rods which have to split bundles of yarns, superficially adhering to one another and then finally to a take-up-device. Nylon yarns have specific properties which do not permit of working on the usual slashers. They are smooth and slick and because of their low water-sensibility the size does not adhere firmly to the yarn. The present invention is based on the observation that by their special properties nylon yarns behave in a loom in a different way than other yarns: when a nylon filament breaks, it winds around an adjacent yarn and stops the loom. The size should not be too strong because otherwise adjacent yarns are not easily separated after sizing and on the other hand not too soft in order to avoid wrapping of loose ends around the unbroken threads. It has been found that a sizing composition of polyvinylalcohol, combined with an alkylolurea-formaldehyde resin . . . (Aquarea Resin N° 4184 D, manuf. by Sharples Chem., is especially mentioned) . . . has the desired effect of smooth separation of the bundles while on the other hand the size is strong enough to prevent the premature separation of the broken threads from the non broken yarns and wrapping around a neighbor thread during the operation on the loom.

References: Several patents, assigned to du Pont recommended sizing with polyvinylcompounds: U. S. Pat. 2,278,902/1942, polyvinyl acetate, boric acid and polyethylene glycol; U. S. Pat. 2,300,074/1942, addition of small quantities of mixtures of polyvinylalcohol and boric acid to other sizing compositions; U. S. Pat. 2,324,601/1943 partly saponified polyvinylacetate etc.

Coating Apparatus G, 3

U. S. Pat. 2,408,504
(S. Bergstein, assignor to R. M. and F. D. Bergstein, October 1, 1946)

The characteristic moment in the coating apparatus, protected by this patent, has to be seen in a combination of a doctor blade, located some distance from the draw roll of the web, bearingtwo side members. These side members are extended from the point, where the fabric leaves the roll, onto the doctor blade. They form together with the blade a kind of reservoir, maintaining always a reserve of the impregnating liquid, preventing losses on material and thus making the operation as economical as possible. In the accompanying drawing the fabric or web (3), coming from a roll is led over a break-over-roll (4) to the principal draw roll (5) being large in comparison with (4). The impregnating liquid is supplied by a tank (17), the doctor blade (6) is located in a certain distance of the roll (5). The side members are formed according to Fig. 6. They are shaped in the part (12), adjacent to roll (5) to conform with the surface of this roll and to follow later on (part 13) the tangential path of the web to the doctor blade.

Coating Apparatus—

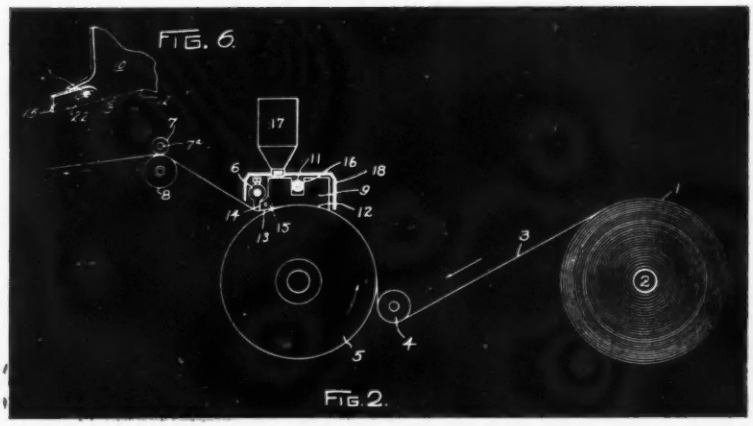


FIG. 2.

ABSTRACTS FROM CONTEMPORARY JOURNALS

Oxygen Balance in Hydrogen Peroxide Bleaching

S. A. Simon and Arthur Drelich, Textile Research Journal, page 609, Vol. XVI, No. 12, December, 1946.

There exists in cotton a number of materials capable of consuming the bleaching agent. It is essential to know the functions of these materials and the oxygen distribution among them. A method for determining this oxygen balance is described. The oxygen evolved during peroxide bleaching is measured. These data in conjunction with those obtained from the decomposition of peroxide have provided a basis for quantitative estimation of the true oxygen consumption by the cotton. This will be useful for evaluating bleaching formulas.

The Dyeometer: An Instrument for Studying Color Reactions

R. H. Kienle, G. L. Royer and H. R. McCleary, Textile Research Journal, page 616, Vol. XVI, No. 12, December, 1946.

The Dyeometer was developed a number of years ago and has been improved since that time. It may be described as an apparatus which permits continuous photometric measurement of the strength of the dye bath during the course of the dyeing. It permits rigid control of every factor believed to influence the progress of dyeing: some of these factors are variation of temperature, volume of the dyebath, circulation of the dyebath, motion of the material being dyed, and control of the surrounding atmosphere. The Dyeometer has been found useful also in the study of any reaction in which a color change within a liquid phase is involved.

Complete construction and operational details are given as well as details of its uses.

Fiber Properties in Relation to Textile Finishing

Textile Mercury and Argus, page 25, Vol. CXVI, No. 3015, January 3, 1947.

This article is concerned with the influence of softening agents. A textile fiber made of cellulose or protein is usually made hard by drying and soft by moistening. The greater the removal of moisture in a cotton or viscose fabric the greater is the resistance to creasing and if the fabric is then allowed to pick up moisture it gradually becomes normally creasable. A wool fiber is naturally highly resistant to creasing. If the cross linkages of the wool are chemically broken under conditions such that fresh ones are not formed then the wool becomes more creasable. It is assumed that by holding the long chain molecules tightly together in a textile fiber it is given good resistance to creasing.

The firmness of handle of a cotton fabric can be associated with a tightening of the bonds between the long chain molecules and a loosening of the bonds can be associated with an increase in softness.

Soaps, waxes, fats and petroleum products which have found use as softeners function by means of their action on the surface of the fiber whereas the softening action of water is due to its presence within the fiber. Special methods have had to be devised to fix softening agents in the textile material so that it will be resistant to a fair amount of washing.

Ozone Methods of Bleaching Yarns or Fabrics

E. Howlett, The Textile Manufacturer, page, 412, Vol. 72, No. 860, August, 1946.

One thirty-second of an ounce of ozone is sufficient to bleach a pound of cotton in an ozonization chamber and it acts rapidly. The principle of bleaching by ozone consists of exposing the material to an atmosphere of air more or less ozonized. The materials must be suitably prepared in order to produce the most favorable bleaching conditions. All fatty matters must be removed. Exposure to ozone takes place in mechanical chambers through which the cloth merely passes. The cloth is exposed in open width from 30 to 90 minutes.

The best method for the formation of ozone is to utilize the silent electric discharge. When oxygen is submitted to the action of electric discharges it is partially transformed into ozone, and this is done by means of ozone producers which consist of one or several units according to the amount required, each unit comprising a metallic frame with glass sides forming an air tight chamber and enclosing ordinary electric condensers. A detailed description of the equipment is given.

The actual process consists of first scouring or kier boiling followed by washing and spreading out. It then enters a washing machine in open width. The washing machine consists of three tanks: the first contains plain water, the second slightly acid water, and the third plain water. The cloth then passes through a mangle which wrings out excess water allowing from 50 to 70 per cent to remain in the cloth. The cloth then enters the ozonization chamber. It is hung in festoons on rods which are carried through the chamber at a speed which allows the fabric to remain in the chamber for the required time. The ozone is passed through the chamber in the opposite direction. On leaving the chamber the cloth is again washed.

The process can also be adapted to yarn bleaching. Mention is also made of a process which consists of treating water with ozone and using it as a bleaching agent.

A number of advantages of the process are cited.

The Steam Demand for Dyeing

W. Goldstern, Journal of the Society of Dyers and Colourists, page 301, Vol. 62, No. 10, October, 1946.

This paper discusses the use of steam in dyeing according to the following divisions: (1) the problem of steam supply for dyeing; (2) theoretical aspects and basic relations of the steam requirements; (3) practical measurements and tests; (4) methods of dealing efficiently with the problem. Under (1) three different types of steam demand are discussed: constant steam demand, steam demand of known fluctuation and steam demand of unknown fluctuation. The last type entails for the boiler house a changing steam pressure, additional work for the firemen, lower boiler efficiency, and higher coal consumption. One result is that the steam supply cannot be kept up to the full requirements of the dyehouse. The problem cannot be solved by reducing the steam demand of individual processes or by devices for saving steam. Various methods have been tried including: (1) staggering, where one process is scheduled to start when another ends to achieve a constant steam load. This method has proved impractical. (2) Warning the boiler house of any alteration in the steam demand. This method has achieved some success. (3) An automatic boiler control which is designed to supply automatically just the right amount of coal and air to the fires so as to maintain a steady steam pressure. This method is useful if the peak loads do not exceed the capacity of the boiler and the fluctuations are not too rapid. (4) Heat storage provides a complete solution especially where a steam accumulator is used. The boiler is enabled to supply steam at a steady rate.

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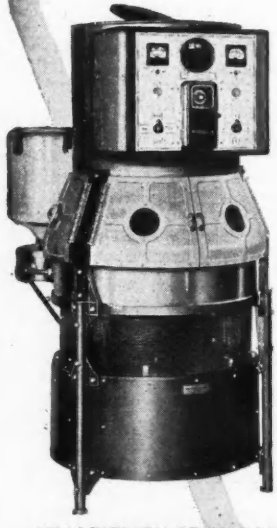

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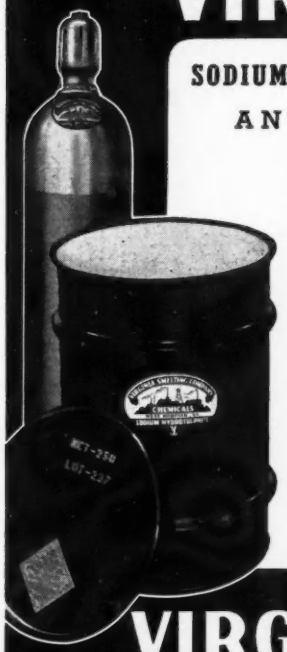

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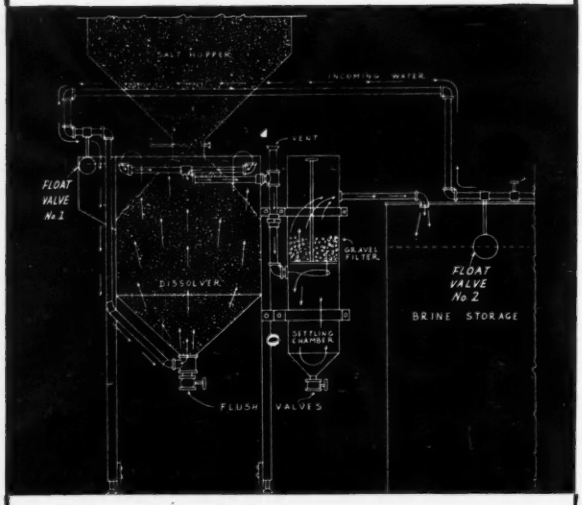

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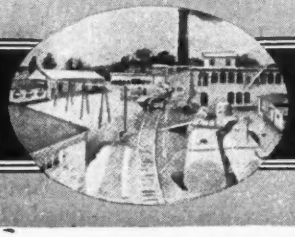

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WANTED: Chemist or practical technician, age 35 to 50 interested in the development of plastic or resin processing of textiles. Must be qualified by practical experience and capable of supervising laboratory research as well as the production of an established finishing plant. All applications confidential. Mail full details to Box 209.

AURAMINE

Do you wish to make this profitable dye? Or are you making it and having troubles? Manufacturing chemist with 15 years successful experience in Auramine manufacture and plant design, American, wishes to contact interested parties. Write Box 210.

WANTED: BOSS DYER for plant located in the South. Must be familiar with vat, sulphur and napthol colors. Must also be familiar with package, raw stock and jig dyeing machines. Salary commensurate with qualifications and ability. Splendid opportunity for right man. Please give full details as to experience in first letter. Write Box 214.

POSITION WANTED: Textile Chemist and Colorist. Over 11 years experience in textile laboratory work. Thoroughly familiar with printing, dyeing and padding of all fibers with dyestuffs and pigments. Capable of working in a supervisory capacity. Desire responsible position with a progressive firm in sales or application laboratory. Write Box 211.

BUSINESS OPPORTUNITY — CHEMICAL SALESMAN

Experienced Chemist desires to set-up textile chemical factory with successful established salesman. Can manufacture complete line of superior products including all finishing agents, detergents, penetrants, cationics, sizes, sulfonated oils, etc. Joint capital investment. Confidential. Write Box 212.

POSITION WANTED: Experienced Dyer on knitted fabrics of Acetate, Rayon, Cotton and Nylon would like to change position as head dyer. Employed at present, married. Write Box 213.

LAMEPON

Distributors wanted for LAMEPON, a basis wetting agent combining a wide range of valuable properties, including protective action and superb rinsability. For every type of textile processing in rayon, cotton and wool and as an auxiliary in soaps and textile specialties. Complete technical service. Distributors are placed in a competitive position on an attractive arrangement. Increased production accounts for offer. Protean Chemical Corp., 150 Nassau St., N. Y. City.

WANTED: Manager of Textile Auxiliary Division old Chemical Manufacturer. Requisites in order of importance:—(1) Diplomat and Executive with real initiative; (2) Chemical education and practical application experience; (3) A good instructor and demonstrator; (4) Sales experience with *meritorious* products. Few finer opportunities have been offered the right man. Written application will be held confidential. Write Box 207.

DYER WANTED

THOROUGH KNOWLEDGE IN DYEING ALL TYPES OF WOOLEN AND WORSTED YARNS. EXCELLENT OPPORTUNITY FOR RIGHT MAN. STATE EXPERIENCE IN DETAIL AND SALARY EXPECTED. NEW YORK LOCATION. OUR KEY MEN ARE AWARE OF THIS AD. ALL REPLIES HELD STRICTLY CONFIDENTIAL. WRITE BOX 200.

ADDITIONAL CLASSIFIEDS ON PAGE XXXIII

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

BURK-SCHIER

BURKART-SCHIER CHEMICAL CO., CHATTANOOGA, TENN.

BHAVANIDAS GANGADAS & CO.

233-35, Samuel Street
BOMBAY NO. 3 (INDIA)

DIRECT IMPORTERS

Are interested in the import of the following groups of dyestuffs

DIRECT	**ACID**
BASIC	**DIAZO**
SULPHUR	**VAT**
NAPHTHOLS	**BASES**
FAST SALTS	**RAPID FAST**

also

HEAVY & FINE CHEMICALS

and

CAMPHOR

Offers invited

• CLASSIFIED ADVERTISEMENTS •

WANTED: SALESMAN — With knowledge of dyes and textile specialties, and experience and personal contacts to cover the South for reliable firm, who has business established in southern mills. State age, selling experience, details and salary expected. Prefer one living in South. Write Box 188.

WANTED: Textile Colorist for Modern Print Shop in the Metropolitan Area. Write Box 197.

POSITION WANTED: Hosiery Dyer with several years experience on ladies' hose of Silk, Nylon, Rayon and Cotton. Available for employment on request. Either as Head Dyer or Assistant to Head Dyer. Write Box 198.

POSITION WANTED: Colorist-Chemist, Screen Printing, desires change of employment. Age 30, Textile Institute graduate. Ten years experience with rapidogens, indigosols, chromes, acetates and directs. Can set up colorshop and laboratory to function smoothly and efficiently. Capable of figuring costs per yard. Seeking responsible position with progressive firm, any part of the U. S. or South America. Write Box 202.

POSITION WANTED: Night Superintendent supervising all operations in roller printing plant desires change. Experienced Dyer on all fibers. Seventeen years in the dyeing and printing field. Textile school graduate. Write Box 205.

WANTED: Print Colorist for plant located on West Coast. Must be experienced in roller printing and processing of silk, acetate, viscose and mixtures. When applying please mention age, marital status, salary expected and experience. Write Box 181.

DYESTUFFS WANTED, ALL TYPES, LARGE AND SMALL QUANTITIES, EXCESS INVENTORIES, ALSO INTERMEDIATES AND CHEMICALS. Write Box 171.

WANTED: Graduate Chemist for modern dyehouse in the Metropolitan Area. Must either be a Textile School Graduate or a Chemistry Major with Textile Chemistry experience. Excellent opportunity for the right man. Write Box 196.

Additional Classifieds on Page XXXII

10 PRODUCTS of Proven Dependability

WHICH SHOULD WARRANT ★ YOUR ATTENTION ★

***AQUAROL :** A water repellent for processing woolen, cotton and rayon fabrics, also produces excellent results in splashproofing or finishing all types of hosiery.

***PARAMINE S :** A cation active softener for processing cotton and rayon cloth to obtain a soft, smooth, pleasing finish.

***ALGEPON S :** An assistant in dyeing vat colors to prevent premature oxidation of the reduced bath and eliminate uneven dyeings.

***ALGEPON V A :** Assistant for stripping vat colors—complete reduction of color in stripping bath providing lighter bottom for redyeing.

***PARAPON S A :** A highly efficient leveler and softener for dyeing and finishing all types of yarn, cloth and hosiery to produce a uniform dyeing and a soft full hand.

***ARIPEL F S :** Finish and gas inhibitor for processing dyed acetate rayon—produces a soft full feeling finish and prevents gas fading of the color.

***LANITOL F :** A synthetic detergent possessing exceptional scouring and washing properties for processing wool, cotton, rayon or nylon.

***CULOFIX :** Used as an after treatment in last rinse to prevent bleeding of direct dyed cotton or rayon in water.

***DIAZONOL A C :** For boiling out cotton cloth in pressure or open kiers to produce greater absorbency and cleaner material. Excellent for preboiling knitted cloth in preparation for chlorine bleach. Also used with good results for boiling out cotton or rayon cloth on the jig.

***TETRANOL 1638 :** A rapid wetting and penetrating agent. Active in acid, alkaline and salt solutions and not affected by hard water, may be used in all types of dyeing operations to insure positive penetration of color and a uniform and solid shade.

And a Complete Line of Oils, Chemicals, Softeners and Finishes For Wet Processing All Textile Fibres

*Reg. U.S. Pat. Off.

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Newark, New Jersey

ESTABLISHED OVER 40 YEARS

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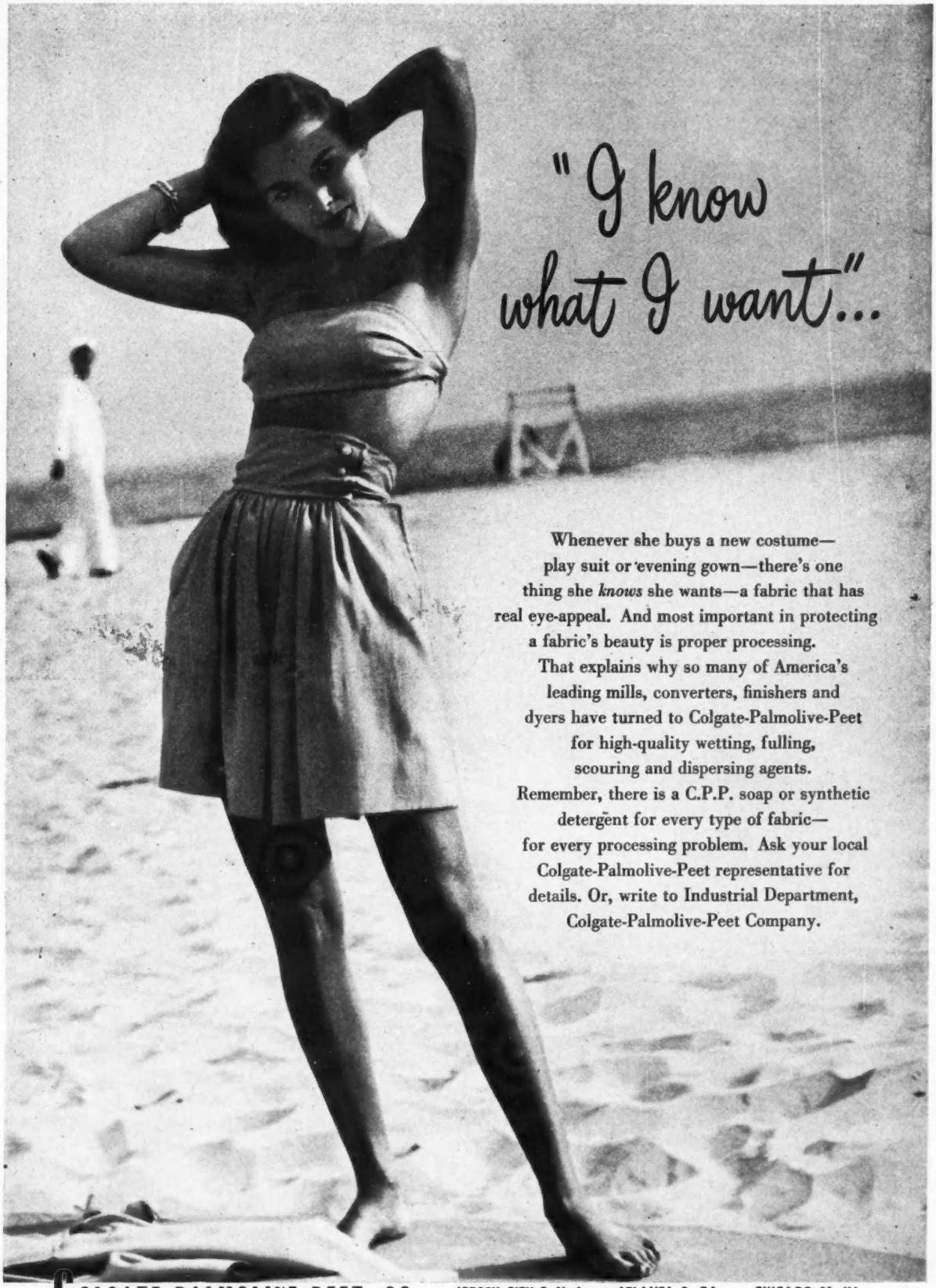

Whenever she buys a new costume—play suit or evening gown—there's one thing she *knows* she wants—a fabric that has real eye-appeal. And most important in protecting a fabric's beauty is proper processing. That explains why so many of America's leading mills, converters, finishers and dyers have turned to Colgate-Palmolive-Peet for high-quality wetting, fulling, scouring and dispersing agents. Remember, there is a C.P.P. soap or synthetic detergent for every type of fabric—for every processing problem. Ask your local Colgate-Palmolive-Peet representative for details. Or, write to Industrial Department, Colgate-Palmolive-Peet Company.

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Things you never saw before

This advertisement is addressed to finishers and dyers who have never used Diastafor brand de-sizing agent—Type L. It is written for the man with an open mind, regardless of old loves and loyalties.

Just as a long-range telescope brings before your eyes things you never saw before, Diastafor—Type L can bring to your finishing and dyeing operations ease of use and flexibility you never dreamed of in a de-sizing agent.

This all-purpose de-sizing agent has been developed especially to enable you to work in a wide temperature range. It will work well in a wide pH range. Whether you are working with cottons, rayons or mixed goods, it will give you a smooth, flawless performance. When you use Diastafor—Type L your finishing problems are simple. Diastafor helps prevent uneven dyeing. Never any impairment of tensile strength.

Bleachers and dyers who have used Diastafor—Type L know it really is the fool-proof de-sizing agent. They have made Diastafor the leader for 39 years because they know they can depend on it for easy, economical performance throughout their de-sizing operations.

If you think we seem over-enthusiastic, you should look over our mail and see what users say about it. We shall be glad to send you further information about Diastafor upon request. Our sales and technical staffs are always at your service to give you assistance on any specific problem. Write Strong Cobb Division of STANDARD BRANDS INCORPORATED, *Diastafor Department*, 595 Madison Avenue, New York 22, New York.

DIASTAFOR

A TRADE MARK OF STANDARD BRANDS INCORPORATED

UNITEXOL AC*

imparts a soft luxurious drape to

RAYONS
COTTONS
and
RAYON-COTTON MIXTURES

The hard, clumsy appearance of even the heaviest unfinished fabrics acquires a soft drapy hand under the magic of Unitexol AC.

Because the ingredients of which Unitexol AC is compounded are not easily sulfonated, hundreds of experiments—conducted by highly skilled laboratory technicians—were necessary to produce this versatile, economical finishing oil.

You will certainly want to investigate the many advantages Unitexol AC brings to textile finishers. A letter will bring you complete details.

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For pleasing the hard-to-please when dyeing indigo on wool, vat colors on cotton, linen, silk, and rayon—in general stripping work on cotton and rayon—your best bet is Vatrolite.

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UNIFORM . . . Strict manufacturing control for top performance.

Remember these two important points! Vatrolite is a *better* reducing agent. It's made only by Royce.

made only by ROYCE

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